YAMAHA

WaveRunner
GP1300R

SERVICE MANUAL

LIT-18616-02-44

F1G-28197-1F-11

NOTICE

This manual has been prepared by Yamaha primarily for use by Yamaha dealers and their trained mechanics when performing maintenance procedures and repairs to Yamaha equipment. It has been written to suit the needs of persons who have a basic understanding of the mechanical and electrical concepts and procedures inherent in the work, for without such knowledge attempted repairs or service to the equipment could render it unsafe or unfit for use.

Because Yamaha has a policy of continuously improving its products, models may differ in detail from the descriptions and illustrations given in this publication. Use only the latest edition of this manual. Authorized Yamaha dealers are notified periodically of modifications and significant changes in specifications and procedures, and these are incorporated in successive editions of this manual.

A10001-0*

WaveRunner GP1300R
SERVICE MANUAL
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1st Edition, February 2003
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Printed in USA
LIT-18616-02-44

HOW TO USE THIS MANUAL

MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.

In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
  Pitting/scratches → Replace.

To assist you in finding your way through this manual, the section title and major heading is given at the top of every page.

ILLUSTRATIONS

The illustrations within this service manual represent all of the designated models.

CROSS REFERENCES

The cross references have been kept to a minimum. Cross references will direct you to the appropriate section or chapter.

IMPORTANT INFORMATION

In this Service Manual particularly important information is distinguished in the following ways.

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, passenger(s), a bystander, or a person inspecting or repairing the watercraft.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the watercraft.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

IMPORTANT:

This part has been subjected to change of specification during production.

HOW TO USE THIS MANUAL

① To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

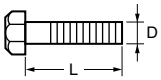
② Numbers are given in the order of the jobs in the exploded diagram.

③ Symbols indicate parts to be lubricated or replaced (see “SYMBOLS”).

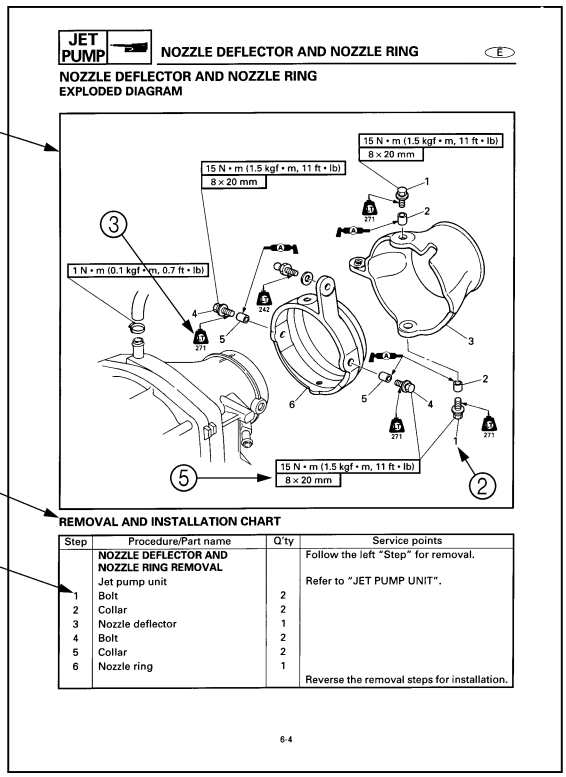
④ A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.

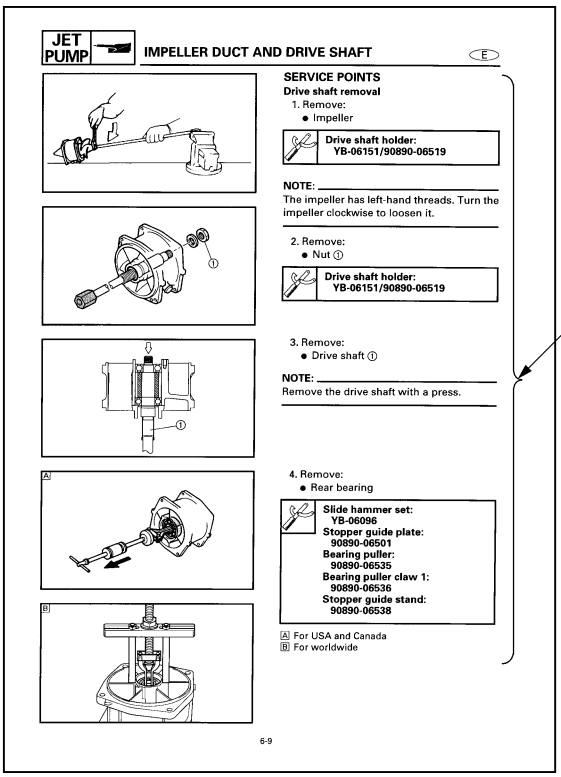
⑤ Dimension figures and the number of parts, are provided for fasteners that require a tightening torque.

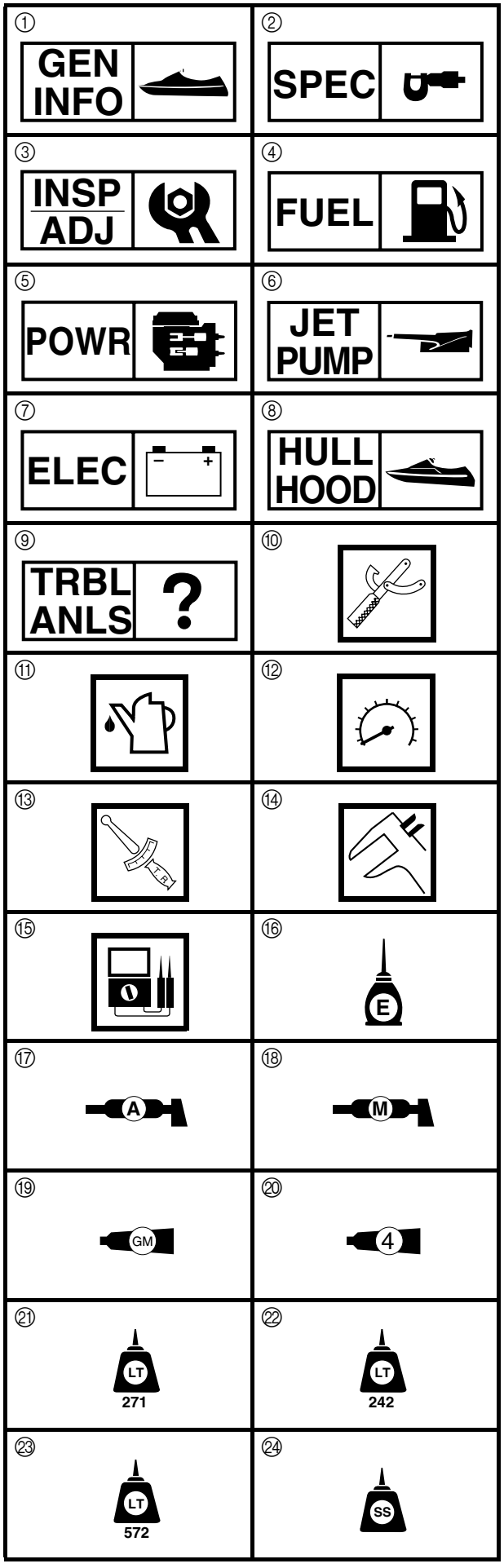
Example:
Bolt or screw size 10 × 25 mm : M10 (D) × 25 mm (L)



⑥ Jobs requiring more information (such as special service tools and technical data) are described sequentially.


JET PUMP
NOZZLE DEFLECTOR AND NOZZLE RING
E
NOZZLE DEFLECTOR AND NOZZLE RING
EXPLODED DIAGRAM
15 N • m (1.5 kgf • m, 11 ft • lb)
8 × 20 mm
1 N • m (0.1 kgf • m, 0.7 ft • lb)
REMOVAL AND INSTALLATION CHART
Step | Procedure/Part name | Q'ty | Service points
NOZZLE DEFLECTOR AND NOZZLE RING REMOVAL | Follow the left “Step” for removal.
Jet pump unit | Refer to “JET PUMP UNIT”.
1 Bolt 2
2 Collar 2
3 Nozzle deflector 1
4 Bolt 2
5 Collar 2
6 Nozzle ring 1
Reverse the removal steps for installation.
6-4





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SYMBOLS

Symbols ① to ⑨ are designed to indicate the content of a chapter.

① General Information
② Specifications
③ Periodic Inspection and Adjustment
④ Fuel System
⑤ Power Unit
⑥ Jet Pump Unit
⑦ Electrical System
⑧ Hull and Hood
⑨ Trouble Analysis

Symbols ⑩ to ⑮ indicate specific data.

⑩ Special service tool
⑪ Specified oil or fluid
⑫ Specified engine speed
⑬ Specified tightening torque
⑭ Specified measurement
⑮ Specified electrical value (resistance, voltage, electric current)

Symbols ⑯ to ⑱ in an exploded diagram indicate the grade of lubricant and the lubrication point.

⑯ Apply Yamaha 2-stroke motor oil
⑰ Apply water resistant grease (Yamaha grease A, Yamaha marine grease)
⑱ Apply molybdenum disulfide grease

Symbols ⑲ to ㉔ in an exploded diagram indicate the type of sealant or locking agent and the application point.

⑲ Apply Gasket Maker
⑳ Apply Yamabond No. 4
㉑ Apply LOCTITE 271 (red)
㉒ Apply LOCTITE 242 (blue)
㉓ Apply LOCTITE 572
㉔ Apply silicone sealant

NOTE:

Additional symbols may be used in this manual.

A30000-0

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JET PUMP UNIT	JET PUMP	6
ELECTRICAL SYSTEM	ELEC	7
HULL AND HOOD	HULL HOOD	8
TROUBLE ANALYSIS	TRBL ANLS	9

CHAPTER 1
GENERAL INFORMATION

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ENGINE SERIAL NUMBER 1-1
JET PUMP UNIT SERIAL NUMBER 1-1
HULL IDENTIFICATION NUMBER (H.I.N.) 1-1

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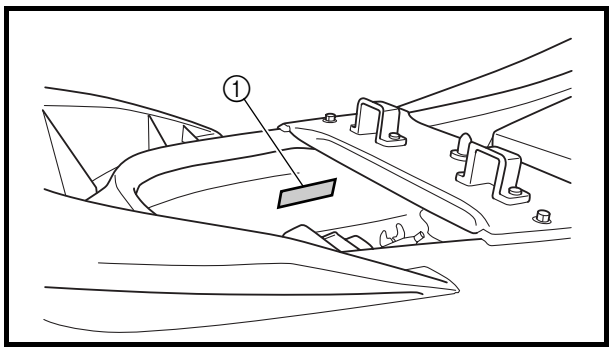

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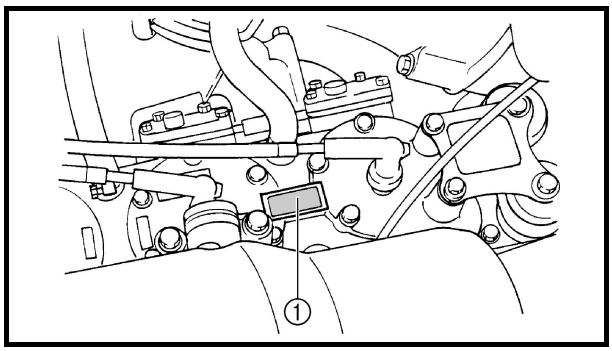
IDENTIFICATION NUMBERS

PRIMARY I.D. NUMBER

The primary I.D. number is stamped on a label ① attached inside the engine compartment.

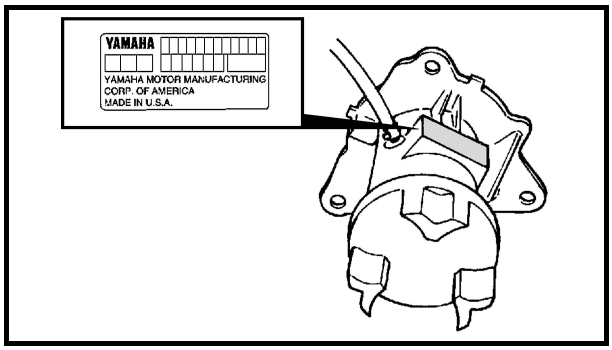
Starting primary I.D. number:
F1G: 800301



ENGINE SERIAL NUMBER

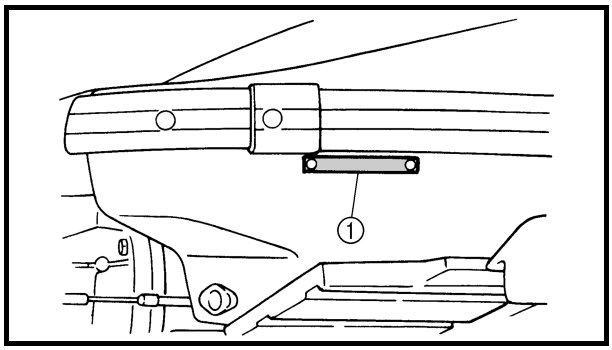
The engine serial number is stamped on a label ① attached to the engine unit.

Starting serial number:
60T: 1000001



JET PUMP UNIT SERIAL NUMBER

The jet pump unit serial number is stamped on a label attached to the intermediate housing.

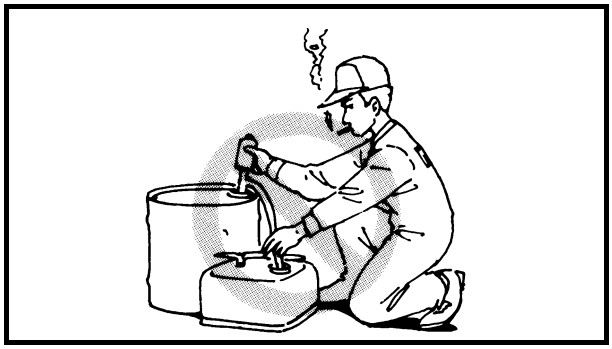


HULL IDENTIFICATION NUMBER (H.I.N.)

The H.I.N. is stamped on a plate ① attached to the hull on the aft, starboard (right) side.

⚠ SAFETY WHILE WORKING

To prevent and accident or injury and to ensure quality service, follow the safety procedures provided below.



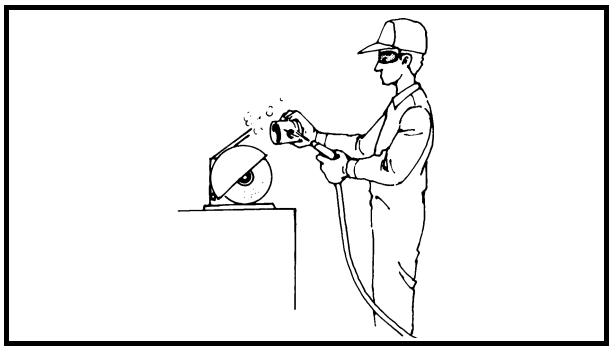
FIRE PREVENTION

Gasoline is highly flammable.

Keep gasoline and all flammable products away from heat, sparks, and open flames.

VENTILATION

Gasoline vapor and exhaust gas are heavier than air and extremely poisonous. If inhaled in large quantities they may cause loss of consciousness and death within a short time. When test running an engine indoors (e.g., in a water tank), be sure to do so where adequate ventilation can be maintained.



SELF-PROTECTION

Protect your eyes by wearing safety glasses or safety goggles during all operation involving drilling and grinding, or when using an air compressor.

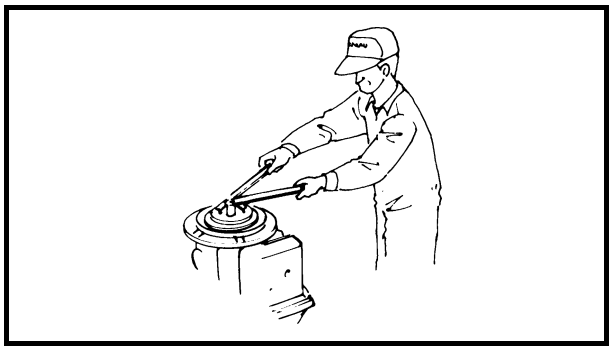
Protect your hands and feet by wearing protective gloves or safety shoes when necessary.

PARTS, LUBRICANTS, AND SEALANTS

Use only genuine Yamaha parts, lubricants, and sealants or those recommended by Yamaha, when servicing or repairing the watercraft.

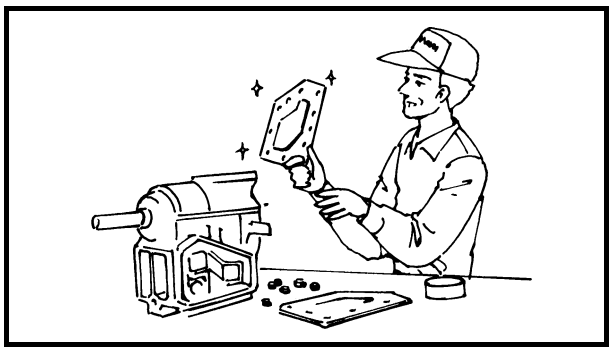
Under normal conditions, the lubricants mentioned in this manual should not harm or be hazardous to your skin. However, you should follow these precautions to minimize any risk when working with lubricants.

1. Maintain good standards of personal and industrial hygiene.
2. Change and wash clothing as soon as possible if soiled with lubricants.
3. Avoid contact with skin. Do not, for example, place a soiled rag in your pocket.
4. Wash hands and any other part of the body thoroughly with soap and hot water after contact with a lubricant or lubricant soiled clothing has been made.
5. To protect your skin, apply a protective cream to your hands before working on the watercraft.
6. Keep a supply of clean, lint-free cloths for wiping up spills, etc.

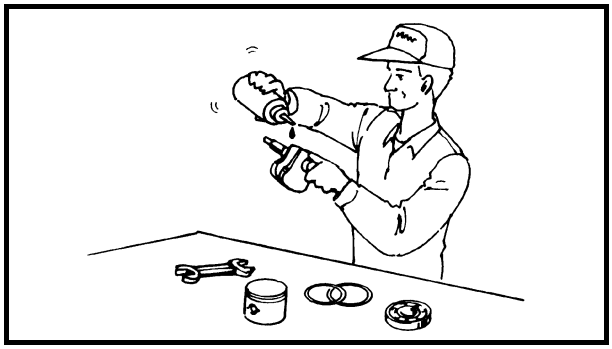


GOOD WORKING PRACTICES

1. **The right tools**
   Use the recommended special service tools to protect parts from damage. Use the right tool in the right manner—do not improvise.
2. **Tightening torques**
   Follow the tightening torque specifications provided throughout the manual. When tightening nuts, bolts, and screws, tighten the large sizes first, and tighten fasteners starting in the center and moving outward.

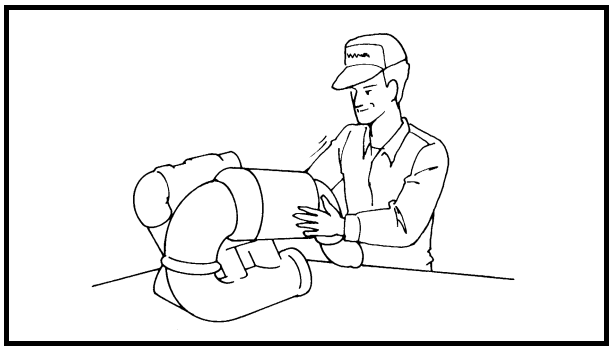


3. **Non-reusable parts**
   Always use new gaskets, seals, O-rings, oil seals, cotter pins, circlips, etc., when installing or assembling parts.



DISASSEMBLY AND ASSEMBLY

1. Use compressed air to remove dust and dirt during disassembly.
2. Apply engine oil to the contact surfaces of moving parts during assembly.



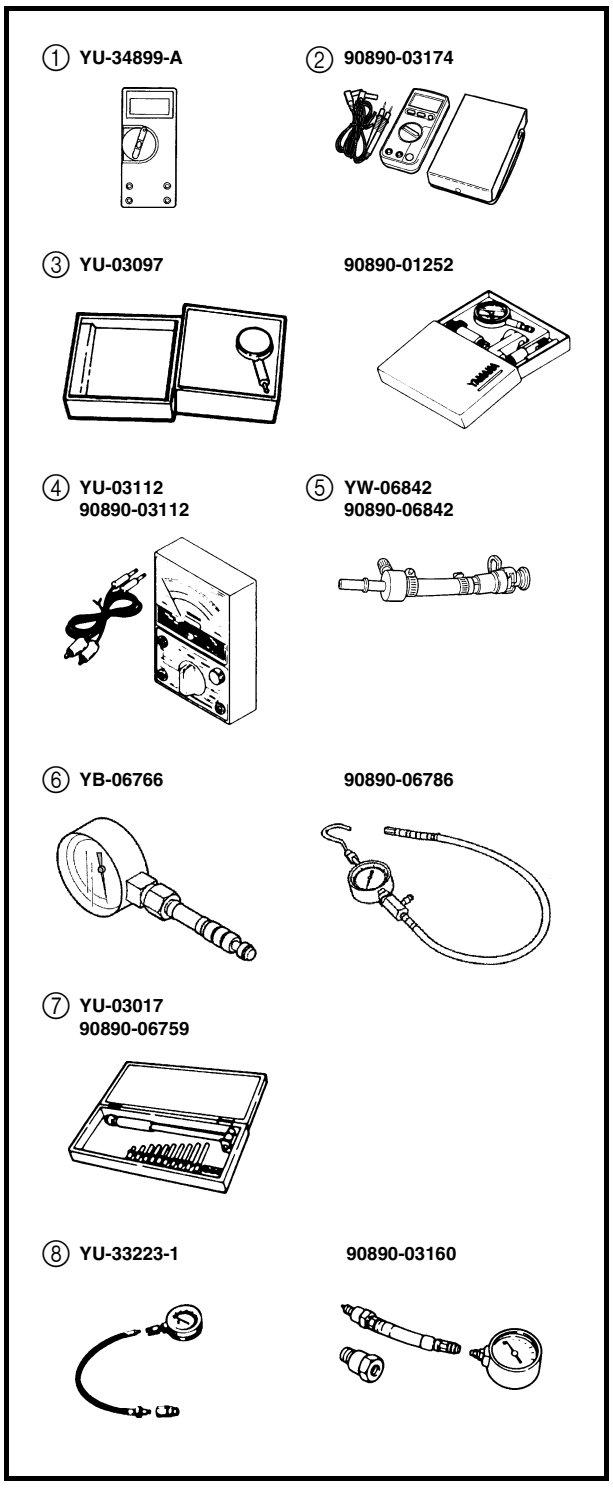
3. Install bearings with the manufacture identification mark in the direction indication in the installation procedure. In addition, be sure to lubricate the bearings liberally.
4. Apply a thin coat of water-resistant grease to the lip and periphery of an oil seal before installation.
5. Check that moving parts operate normally after assembly.

SPECIAL SERVICE TOOLS

Using the special service tools recommended by Yamaha will aid service and enable accurate assembly and tune-up. Improvisations and using improper tools can damage the equipment.

NOTE:

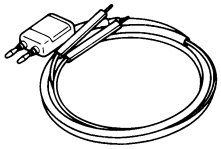
- For USA and Canada, use the special service tools starting with part numbers "J-," "YB-," "YM-," "YS-," "YU-," or "YW-."
- For all other countries, use the special service tools starting with part number "90890-."



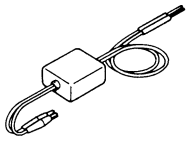
MEASURING AND DIAGNOSIS

① Digital multimeter
YU-34899-A
② Digital circuit tester
90890-03174
③ Dial gauge
YU-03097
90890-01252
④ Pocket tester
YU-03112
90890-03112
⑤ Fuel pressure gauge adapter
YW-06842
90890-06842
⑥ Fuel pressure gauge
YB-06766
90890-06786
⑦ Cylinder gauge set
YU-03017
90890-06759
⑧ Compression gauge
YU-33223-1
90890-03160

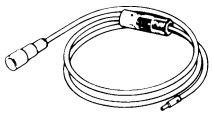
⑨ **YU-39991**



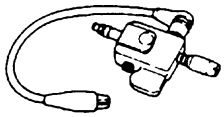
⑩ **90890-03172**



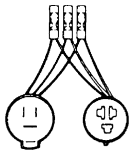
⑪ **YM-34487**



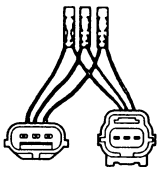
⑫ **90890-06754**



⑬ **YB-06870**
90890-06870



⑭ **YB-06869**
90890-06869



⑮ **YB-06848**
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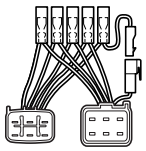

⑯ **YB-06849**
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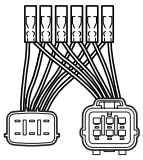
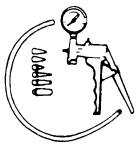


⑰ **YB-35956-A**
90890-06756



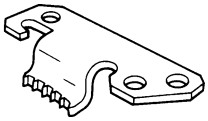
⑱ **60V-WS853-01**

⑨ Peak volt meter adapter
YU-39991
⑩ Peak voltage adapter B
90890-03172
⑪ Spark gap tester
YM-34487
⑫ Ignition tester
90890-06754
⑬ Lighting coil tester (3 pins)
YB-06870
Test harness SMT250-3 (3 pins)
90890-06870
⑭ Air pressure sensor tester (3 pins)
YB-06869
Test harness EJ-II-3 (3 pins)
90890-06869
⑮ Test harness (6 pins)
YB-06848
Test harness FSW-6A (6 pins)
90890-06848
⑯ Test harness (6 pins)
YB-06849
Test harness SM6195021-6 (6 pins)
90890-06849
⑰ Lower unit pressure/vacuum tester
YB-35956-A
Vacuum/pressure pump gauge set
90890-06756
⑱ Yamaha diagnostic system
(CD-ROM only)
60V-WS853-01

① YW-06551

90890-06551

② YW-06550
90890-06550



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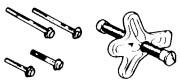

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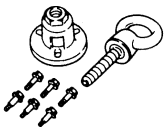

⑤ YB-06151
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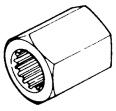
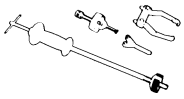


⑥ YB-06096



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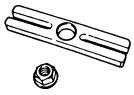

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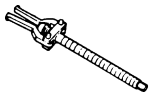

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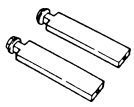
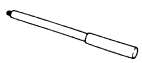
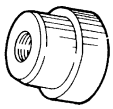


⑩ 90890-06652



⑪ YB-06112
YB-06196



⑫ 90890-06614
90890-06653

REMOVAL AND INSTALLATION

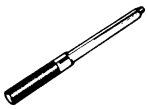
① Coupler wrench
YW-06551
90890-06551
② Flywheel holder
YW-06550
90890-06550
③ Universal puller
YB-06117
④ Flywheel puller
90890-06521
⑤ Drive shaft holder (impeller)
YB-06151
Drive shaft holder 5 (impeller)
90890-06519
⑥ Slide hammer and adapters
(jet pump bearing)
YB-06096
⑦ Stopper guide plate (jet pump bearing)
90890-06501
⑧ Bearing puller assembly
(jet pump bearing)
90890-06535
⑨ Stopper guide stand (jet pump bearing)
90890-06538
⑩ Driver rod L3 (jet pump bearing)
90890-06652
⑪ Bearing housing needle bearing remover
(jet pump bearing)
YB-06112
Drive shaft needle bearing installer and
remover (jet pump oil seal)
YB-06196
⑫ Needle bearing attachment
(jet pump bearing and oil seal)
90890-06614, 90890-06653

SPECIAL SERVICE TOOLS

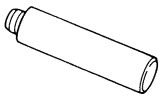
⑬ **YB-06085**

⑭ **90890-06634**

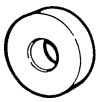
⑮ **YB-06071**



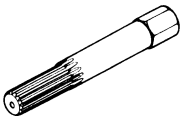
⑯ **90890-06606**



⑰ **YB-34474**



⑱ **YB-06552**
90890-06552



⑲ **YB-06156**
90890-06626

⑬ Outer race installer—forward gear (jet pump oil seal)
YB-06085

⑭ Ball bearing attachment (jet pump oil seal)
90890-06634

⑮ Driver handle—large (intermediate shaft and jet pump)
YB-06071

⑯ Driver rod LS (intermediate shaft and jet pump)
90890-06606

⑰ Drive shaft needle bearing depth stop (jet pump bearing)
YB-34474

⑱ Shaft holder (intermediate shaft)
YB-06552
Crankshaft holder 20 (intermediate shaft)
90890-06552

⑲ Drive shaft taper roller bearing cup installer (intermediate shaft)
YB-06156
Bearing outer race attachment (intermediate shaft)
90890-06626

CHAPTER 2
SPECIFICATIONS

GENERAL SPECIFICATIONS 2-1

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GENERAL SPECIFICATIONS

Item	Unit	Model
		GP1300R
Model code		
Hull		F1G
Engine/jet		60T
Dimensions		
Length	mm (in)	2,930 (115.4)
Width	mm (in)	1,150 (45.3)
Height	mm (in)	1,020 (40.2)
Dry weight	kg (lb)	297 (653)
Maximum capacity	Person/kg (lb)	2/160 (353)
Performance		
Maximum output	kW (PS) at r/min	121.4 (165) at 7,000
Maximum fuel consumption	l/h (US gal/h, lmp gal/h)	63.0 (16.6, 13.9)
Cruising range	h	0.95
Engine		
Engine type		2-stroke
Number of cylinders		3
Displacement	cm^3 (cu. in)	1,297 (79.1)
Bore × stroke	mm (in)	84 × 78 (3.31 × 3.07)
Compression ratio		
#1, #2		5.9:1
#3		5.7:1
Intake system		Reed valve
Scavenging system		Loop charge
Exhaust system		Wet exhaust/YPVS
Lubrication system		Variable oil injection
Cooling system		Water cooled
Starting system		Electric starter
Ignition system		Digital CDI
Spark plug model (manufacturer)		BR8ES-11 (NGK)
Spark plug gap	mm (in)	1.0–1.1 (0.039–0.043)
Battery		
Voltage, capacity	V, Ah	12, 19
Generator output	A at r/min	15 at 6,000

GENERAL SPECIFICATIONS

Item	Unit	Model
		GP1300R
Drive unit		
Propulsion system		Jet pump
Jet pump type		Axial flow, single stage
Impeller rotation		Counterclockwise (viewed from rear)
Transmission		Direct drive from engine
Jet thrust nozzle horizontal angle	Degree	23 + 23
Jet thrust nozzle trim angle	Degree	–5, 0, 5, 10, 15
Trim system		Manual 5 positions
Reverse system		NA
Fuel and oil		
Fuel		Regular unleaded gasoline
Minimum fuel rating	PON[*1]	86
	RON[*2]	90
Oil		YAMALUBE 2-W[*3]
Fuel-oil ratio (wide open throttle)		30:1
Fuel tank capacity	L (US gal, Imp gal)	60 (15.9, 13.2)
Oil tank quantity	L (US qt, Imp qt)	5.5 (1.5, 1.2)

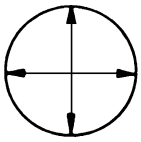
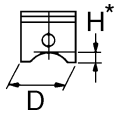
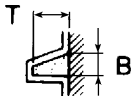
[*1] Pump Octane Number = (Motor Octane Number + Research Octane Number)/2
[*2] Research Octane Number
[*3] YAMALUBE 2-W has been developed for this watercraft and it is available at a Yamaha dealer.

CAUTION:

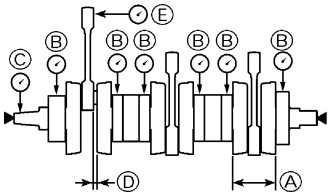
Use only YAMALUBE 2-W oil. Using another oil can seriously damage the catalytic converter and other engine components.

MAINTENANCE SPECIFICATIONS

ENGINE

Item	Unit	Model
		GP1300R
Cylinder head		
Warpage limit	mm (in)	0.05 (0.002)
Minimum compression pressure*1	kPa (kgf/cm^2, psi)	640 (6.4, 91)
Cylinders		
Bore size 	mm (in)	84.000–84.018 (3.3071–3.3078)
Taper limit	mm (in)	0.080 (0.0031)
Out-of-round limit	mm (in)	0.050 (0.0020)
Wear limit	mm (in)	84.100 (3.3110)
Pistons		
Piston diameter	mm (in)	Red: 83.899–83.902 (3.3031–3.3032) Orange: 83.903–83.906 (3.3033–3.3034) Green: 83.907–83.910 (3.3034–3.3035) Purple: 83.911–83.914 (3.3036–3.3037)
Measuring point* 	mm (in)	11 (0.43)
Piston-to-cylinder clearance	mm (in)	0.100–0.105 (0.0039–0.0041)
Wear limit	mm (in)	0.155 (0.0061)
Piston pin boss inside diameter	mm (in)	22.008–22.020 (0.8665–0.8669)
Piston rings		
Top 		
Type		Keystone
Dimension (B)	mm (in)	1.47–1.49 (0.058–0.059)
Dimension (T)	mm (in)	3.0–3.2 (0.118–0.126)
End gap	mm (in)	0.45–0.60 (0.018–0.024)
Ring groove clearance	mm (in)	0.020–0.070 (0.0008–0.0028)
2nd		
Type		Keystone
Dimension (B)	mm (in)	1.47–1.49 (0.058–0.059)
Dimension (T)	mm (in)	3.0–3.2 (0.118–0.126)
End gap	mm (in)	0.45–0.60 (0.018–0.024)
Ring groove clearance	mm (in)	0.020–0.070 (0.0008–0.0028)
Piston pins		
Outside diameter	mm (in)	21.995–22.000 (0.8659–0.8661)
Wear limit	mm (in)	21.990 (0.8657)
Connecting rod		
Small end inside diameter	mm (in)	26.995–27.008 (1.0628–1.0633)

*1 Measuring conditions:
Engine temperature 48 °C (118 °F), wide open throttle, with spark plugs removed from all cylinders.
The figures are for reference only.

Item	Unit	Model
		GP1300R
Crankshaft assembly		
Crank width Ⓐ	mm (in)	72.95–73.00 (2.872–2.874)
Deflection limit Ⓑ	mm (in)	0.05 (0.002)
Deflection limit Ⓒ	mm (in)	0.15 (0.006)
Big end side clearance Ⓓ	mm (in)	0.250–0.750 (0.0098–0.0295)
Maximum small end axial play Ⓔ	mm (in)	2.000 (0.0787)
		
Throttle body		
Model/quantity		60TA/3
Manufacturer		SANSHIN
ID mark		60T00
Trolling speed	r/min	1,250–1,450
Reed valves		
Thickness	mm (in)	0.6 (0.024)
Reed valve stopper height	mm (in)	10.5–10.9 (0.413–0.429)
Reed valve warpage limit	mm (in)	1.5 (0.059)
Fuel pump		
Pump type		Electrical
Output pressure	kPa (kgf/cm^2, psi)	320.8–327.2 (3.21–3.27, 45.62–46.53)
Coupling clearance		
Vertical	mm (in)	0–0.5 (0–0.020)
Horizontal	mm (in)	2–4 (0.079–0.157)

JET PUMP UNIT

Item	Unit	Model
		GP1300R
Jet pump		
Impeller material		Stainless steel
Number of impeller blades		4
Impeller pitch angle	Degree	16.3
Impeller clearance	mm (in)	0.7–0.9 (0.028–0.035)
Impeller clearance limit	mm (in)	0.9 (0.035)
Drive shaft runout limit	mm (in)	0.30 (0.0118)
Nozzle diameter	mm (in)	85.0–85.6 (3.35–3.37)

HULL AND HOOD

Item	Unit	Model
		GP1300R
Free play		
YPVS cable slack	mm (in)	0.5–1.5 (0.02–0.06)
Throttle lever free play	mm (in)	4–7 (0.16–0.28)

ELECTRICAL

Item	Unit	Model
		GP1300R
Battery		
Type		Fluid
Voltage, capacity	V, Ah	12, 19
Specific gravity		1.28
ECM unit (B/R – Ground for cylinder #1) (B/W – Ground for cylinder #2) (B/Y – Ground for cylinder #3)		
Output peak voltage lower limit		
at cranking	V	0.8
at 2,000 r/min	V	174
at 3,500 r/min	V	156
Stator		
Pickup coil (W/R, W/B, W/Y – B)		
Output peak voltage		
at cranking 1	V	6.0
at cranking 2	V	6.0
at 2,000 r/min	V	24
at 3,500 r/min	V	40
Pickup coil resistance 1 (W/R – B)	Ω	459–561
Pickup coil resistance 2 (W/B – B)	Ω	459–561
Pickup coil resistance 3 (W/Y – B)	Ω	459–561
Lighting coil (G – G)		
Output peak voltage		
at cranking 1	V	9.0
at cranking 2	V	7.5
at 2,000 r/min	V	12.5
at 3,500 r/min	V	12.5
Lighting coil resistance (G – G)	Ω	0.54–0.66

Cranking 1: unloaded
Cranking 2: loaded

Item	Unit	Model
		GP1300R
Ignition coil		
Minimum spark gap	mm (in)	10–11 (0.39–0.43)
Primary coil resistance (B/W – body)	Ω	0.26–0.36
Secondary coil resistance (B/W – spark plug lead terminal)	kΩ	3.5–4.7
Spark plug lead resistance		
#1	kΩ	6.1–14.3
#2	kΩ	4.5–10.9
#3	kΩ	3.3–8.2
Rectifier/regulator (R – B)		
Output peak voltage (unloaded)		
at 3,500 r/min	V	14.5
Starter motor		
Type		Bendix
Output	kW	0.8
Rating	Seconds	30
Brush length	mm (in)	12.5 (0.49)
Wear limit	mm (in)	6.5 (0.26)
Commutator undercut	mm (in)	0.7 (0.03)
Limit	mm (in)	0.2 (0.01)
Commutator diameter	mm (in)	28.0 (1.10)
Limit	mm (in)	27.0 (1.06)
Starter relay		
Rating	Seconds	30
Engine temperature sensor		
Engine temperature sensor resistance (B/Y – B/Y)		
at 20 °C (68 °F)	kΩ	54.2–69.0
at 100 °C (212 °F)	kΩ	3.12–3.48
Intake air temperature sensor		
Intake air temperature sensor resistance		
at 0 °C (32 °F)	kΩ	5.4–6.6
at 80 °C (176 °F)	kΩ	0.29–0.39
Atmospheric pressure sensor output voltage (P/G – B/O)	V at kPa (kgf/cm^2, psi)	4.00 at 101.3 (1.01, 14.4)
	V at kPa (kgf/cm^2, psi)	1.97 at 50 (0.5, 7.1)
	V at kPa (kgf/cm^2, psi)	0.79 at 20 (0.2, 2.8)

Item	Unit	Model
		GP1300R
Exhaust temperature sensor resistance		
at 300 °C (572 °F)	kΩ	73–241
at 600 °C (1,112 °F)	kΩ	0.86–1.58
at 900 °C (1,652 °F)	Ω	64–90
Cooling water temperature sensor resistance		
at 0 °C (32 °F)	kΩ	24.0–37.1
at 100 °C (212 °F)	kΩ	0.87–1.18
at 200 °C (392 °F)	Ω	104–153
Speed sensor		
Output voltage (on pulse)	V	11.6
Output pulse/one full turn		2
Throttle position sensor		
Output voltage (P – B/O)		
at trolling speed	V	0.793–0.807
Fuel sender		
Fuel sender resistance		
Position A	Ω	133.5–136.5
Position B	Ω	5–7
Fuel injector		
Fuel injector resistance[*1]	Ω	13.8
Oil level sensor		
Oil level sensor resistance		
Position A	Ω	292–308
Position B	Ω	97–103
Position C	Ω	0–3
Fuse		
Rating		
Main	V/A	12/20
Multifunction meter	V/A	12/3
Electrical bilge pump	V/A	12/3

[*1] The figures are for reference only.

TIGHTENING TORQUES

SPECIFIED TORQUES

Part to be tightened		Part name	Thread size	Q'ty	Tightening torques			Remarks
					N•m	kgf•m	ft•lb	
Fuel system								
Strap/fuel tank/oil tank – hull		Bolt	M8	4	16	1.6	11	572
Oil filler hose screw clamp		—	—	1	0.6	0.06	0.4	
Retainer/fuel pump module – fuel tank	1st	Nut	—	9	3.2	0.32	2.3	
	2nd				6.4	0.64	4.6	
Fuel filler hose screw clamp		—	—	2	3.7	0.37	2.7	
Cap screw clamp (fuel tank)		—	—	1	1.3	0.13	0.9	
Intake silencer screw clamp		—	—	1	2.5	0.25	1.8	
Intake silencer pipe screw clamp		—	—	2	2.5	0.25	1.8	
Intake duct – exhaust chamber bracket	1st	Bolt	M8	1	9.0	0.9	6.5	242
	2nd				18	1.8	13	
Intake duct – generator cover	1st	Bolt	M8	2	9.0	0.9	6.5	242
	2nd				18	1.8	13	
Throttle bodies assembly – throttle bodies bracket 1, 2	1st	Bolt	M8	2	9.0	0.9	6.5	242
	2nd				18	1.8	13	
Throttle cable locknut and adjuster (throttle bodies end)		—	—	1	11	1.1	8.0	
Intake air temperature sensor – intake silencer case cover		—	—	1	7.5	0.75	5.4	572
Intake silencer case cover – intake silencer case		Tapping screw	ø6	13	1.8	0.18	1.3	
Flame arrester – intake silencer case		Screw	M5	6	0.8	0.08	0.6	
Fuel rail – throttle bodies		Bolt	M6	3	8.8	0.88	6.4	
Oil pump cable – oil pump lever	1st	Bolt	M5	1	2.2	0.22	1.6	572
	2nd				4.4	0.44	3.2	
Oil pump cable locknut and adjuster		—	—	1	11	1.1	8.0	
Bleed hose stay – exhaust chamber bracket		Bolt	M6	1	7.6	0.76	5.5	
Oil pump – generator cover	1st	Bolt	M6	2	3.8	0.38	2.7	
	2nd				7.6	0.76	5.5	
Air bleed screw		—	—	1	3.4	0.34	2.5	
Engine								
Spark plug		—	—	3	25	2.5	18	
Muffler cover – muffler		Bolt	M6	3	12	1.2	8.7	242
Outer exhaust joint screw clamp		—	—	2	2.5	0.25	1.8	
Inner exhaust joint screw clamp		—	—	2	1.5	0.15	1.1	
Exhaust joint screw clamp		—	—	2	2.5	0.25	1.8	
Eye – muffler		Nut	M10	2	39	3.9	28	271
Eye – cylinder head		Bolt	M10	4	39	3.9	28	271
Muffler stay – cylinder		Bolt	M10	2	39	3.9	28	271

TIGHTENING TORQUES

Part to be tightened		Part name	Thread size	Q'ty	Tightening torques			Remarks
					N•m	kgf•m	ft•lb	
Muffler stay 2 – crankcase		Bolt	M10	2	39	3.9	28	271
Muffler – muffler stay 2		Bolt	M10	1	39	3.9	28	271
Exhaust temperature sensor		—	—	1	39	3.9	28	572
Cooling water temperature sensor		—	—	1	20	2.0	14	572
Muffler stay – catalytic converter housing	1st	Bolt	M10	2	15	1.5	11	271
	2nd				39	3.9	28	
Cover/catalytic converter housing/catalytic converter – muffler	1st	Bolt	M8	6	15	1.5	11	271
	2nd				33	3.3	24	
Mixing joint – muffler	1st	Bolt	M8	6	11	1.1	8.0	271
	2nd				22	2.2	16	
Exhaust chamber assembly – exhaust manifold		Bolt	M10	4	39	3.9	28	271
Exhaust chamber stay/ exhaust chamber assembly – exhaust chamber bracket		Bolt	M10	2	39	3.9	28	271
Exhaust chamber joint – exhaust chamber		Bolt	M10	6	39	3.9	28	271
Coupling cover – intermediate housing assembly		Bolt	M6	1	7.9	0.79	5.7	572
Engine unit – engine mount		Bolt	M8	4	17	1.7	12	572
Exhaust manifold – cylinder	1st	Bolt	M10	10	22	2.2	16	271
	2nd				39	3.9	28	
	1st	Nut	M10	2	22	2.2	16	
	2nd				39	3.9	28	
Cooling water joint – exhaust manifold		Bolt	M6	6	12	1.2	8.7	242
Throttle bodies bracket 1, 2/ throttle bodies joint/balance plate/plate/reed valve assembly – crankcase	1st	Bolt	M6	4	3.8	0.38	2.7	572
	2nd				7.6	0.76	5.5	
Throttle bodies joint/ balance plate/plate/reed valve assembly – crankcase	1st	Bolt	M6	14	3.8	0.38	2.7	572
	2nd				7.6	0.76	5.5	
Balance plate/plate/reed valve assembly – crankcase	1st	Bolt	M6	4	3.8	0.38	2.7	572
	2nd				7.6	0.76	5.5	
Valve stopper/reed valve – reed valve base		Screw	M3	24	1.0	0.1	0.7	242
YPVS cable holder/YPVS valve cover – cylinder		Bolt	M6	2	9.8	0.98	7.1	572
YPVS valve cover – cylinder		Bolt	M6	10	9.8	0.98	7.1	572
YPVS valve arm – shaft 1, 2, 3		Bolt	M4	3	2.8	0.28	2.0	242
YPVS valve stopper bolt		—	M5	3	3.8	0.38	2.7	242

Part to be tightened		Part name	Thread size	Q'ty	Tightening torques			Remarks
					N•m	kgf•m	ft•lb	
Ground lead – cylinder head	1st	Bolt	M6	1	3.8	0.38	2.7	
	2nd				7.6	0.76	5.5	
Exhaust chamber stay/ cylinder head – cylinder	1st	Bolt	M8	2	15	1.5	11	572
	2nd				35	3.5	25	
Cylinder head – cylinder	1st	Bolt	M8	16	22	2.2	16	572
	2nd				22	2.2	16	
	3rd				35	3.5	25	
Anode – cylinder head		Screw	M5	2	4.4	0.44	3.2	
Engine temperature sensor – cylinder		—	—	1	15	1.5	11	
Cylinder – crankcase	1st	Bolt	M10	12	22	2.2	16	572
	2nd				39	3.9	28	
Generator cover – crankcase	1st	Bolt	M10	7	15	1.5	11	271
	2nd				50	5.0	36	
Generator cover/ground lead – crankcase	1st	Bolt	M10	1	15	1.5	11	
	2nd				50	5.0	36	
Exhaust chamber bracket – crankcase		Bolt	M10	4	39	3.9	28	271
Cable holder – generator cover		Bolt	M6	2	14	1.4	10	242
Pickup coil – generator cover		Bolt	M5	6	4.9	0.49	3.5	242
Lighting coil – generator cover		Bolt	M6	3	14	1.4	10	242
Drive coupling – crankshaft assembly		Drive coupling	—	1	36	3.6	25	572
Flywheel magneto – crankshaft assembly		Bolt	M10	1	74	7.4	53	E
Starter motor/negative battery lead – crankcase	1st	Bolt	M8	1	9.0	0.9	6.5	A
	2nd				18	1.8	13	
Starter motor – crankcase	1st	Bolt	M8	1	9.0	0.9	6.5	
	2nd				18	1.8	13	
Mount bracket – lower crankcase	1st	Bolt	M8	6	15	1.5	11	271
	2nd				27	2.7	19	
Upper crankcase – lower crankcase	1st	Bolt	M8	17	15	1.5	11	271
	2nd				27	2.7	19	
			M6	10	11	1.1	8.0	
Jet pump unit								
Steering cable joint – jet thrust nozzle		Nut	—	1	6.8	0.68	4.9	242
Ride plate – hull		Bolt	M8	4	17	1.7	12	572
Intake duct – hull		Bolt	M8	4	17	1.7	12	572
Intake grate – hull		Bolt	M6	4	7.4	0.74	5.4	572
Speed sensor – ride plate		Screw	M5	4	3.7	0.37	2.7	242
Jet pump unit assembly/impeller housing 2 – transom		Bolt	M10	4	40	4.0	29	572
			M6	1	7.8	0.78	5.6	
Nozzle ring – nozzle		Bolt	M8	2	15	1.5	11	271

TIGHTENING TORQUES

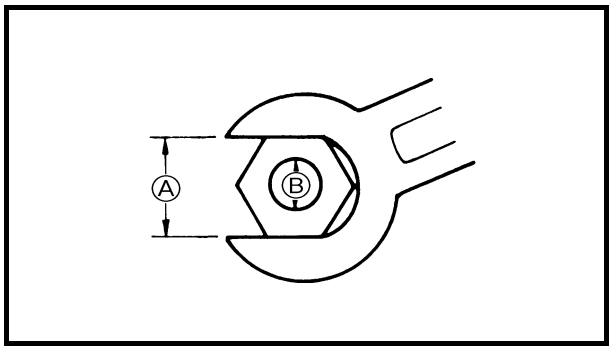
Part to be tightened	Part name	Thread size	Q'ty	Tightening torques			Remarks
				N•m	kgf•m	ft•lb	
Jet thrust nozzle – nozzle ring	Bolt	M8	2	15	1.5	11	271
Spout hose screw clamp	—	—	1	1.2	0.12	0.9	
Nozzle/impeller duct assembly – impeller housing 1	Bolt	M10	4	40	4.0	29	572
Water inlet cover/water inlet strainer – impeller duct	Bolt	M6	4	6.6	0.66	4.8	572
Drive shaft nut – drive shaft	Nut	—	1	74	7.4	53	
Impeller (left-hand threads) – drive shaft	Impeller	M22	1	75	7.5	54	572
Transom plate – hull	Nut	—	4	26	2.6	19	
Intermediate housing – bulkhead	Bolt	M8	3	17	1.7	12	572
Driven coupling – shaft	Driven coupling	M24	1	36	3.6	25	572
Grease nipple – intermediate housing	Nipple	—	1	5.4	0.54	3.9	572
Hull and hood							
Handlebar cover – handlebar cover stay	Screw	M6	4	1.1	0.11	0.8	
Handlebar cover stay – steering column	Screw	M6	4	2.9	0.29	2.1	
Upper handlebar holder/lower handlebar holder – steering column	Bolt	M8	4	16	1.6	11	
QSTS converter – hull	Nut	M6	2	5.4	0.54	3.9	
QSTS cable 1, 2 locknut	—	—	2	16	1.6	11	
Throttle lever assembly – handlebar	Screw	M5	2	3.4	0.34	2.5	
Handlebar switch assembly – handlebar	Screw	M5	2	3.4	0.34	2.5	
QSTS grip assembly – handlebar	Screw	M6	1	3.4	0.34	2.5	
Grip end – handlebar	Bolt	M5	2	1.2	0.12	0.9	
QSTS cable housing – cover	Screw	M4	1	1.0	0.1	0.7	
Plate/steering column assembly – deck	Nut	M8	2	16	1.6	11	
Steering column assembly – deck	Nut	M8	2	16	1.6	11	
Steering arm – steering column	Nut	M8	1	16	1.6	11	
Magnet – steering arm	Screw	M5	1	2.0	0.2	1.4	242
Steering cable ball joint – steering arm	Nut	M6	1	5.0	0.5	3.6	
Handlebar stopper – steering column housing	Nut	M10	1	26	2.6	19	
QSTS cable locknut (nozzle ring side)	—	—	1	3.8	0.38	2.7	
QSTS cable – hull	Nut	—	1	5.9	0.59	4.3	
QSTS cable end – pin – QSTS converter	Nut	M6	1	3.8	0.38	2.7	

TIGHTENING TORQUES

Part to be tightened	Part name	Thread size	Q'ty	Tightening torques			Remarks
				N•m	kgf•m	ft•lb	
Steering cable locknut (jet thrust nozzle end)	—	—	1	6.5	0.65	4.7	
Steering cable – hull	Nut	—	1	5.9	0.59	4.3	
Steering cable holder – bracket	Bolt	M6	1	6.4	0.64	4.6	
Speed sensor lead – hull	Nut	—	1	5.9	0.59	4.3	
Hinge assembly – hood	Bolt	M6	2	12	1.2	8.7	
Visor – hood	Screw	M5	8	1.0	0.1	0.7	
Hood lock – hood	Bolt	M6	2	5.4	0.54	3.9	
Hinge assembly – deck	Nut	M8	2	16	1.6	11	
Steering console cover assembly – deck	Nut	M6	2	5.4	0.54	3.9	
	Bolt	M6	4	2.9	0.29	2.1	
	Screw	M5	2	2.0	0.2	1.4	
	Nut	M8	2	16	1.6	11	
Multifunction meter – holder	Nut	M5	2	1.8	0.18	1.3	
Steering console cover – side cover	Screw	M6	4	2.9	0.29	2.1	
Steering console cover – glove compartment	Screw	M5	4	1.3	0.13	0.9	
Steering cable bracket – deck	Bolt	M6	1	6.4	0.64	4.6	
Buzzer bracket/deck – steering cable bracket	Bolt	M6	2	6.4	0.64	4.6	
Hood lock assembly – deck	Nut	M6	2	6.4	0.64	4.6	
Seat lock assembly – seat	Bolt	M6	2	6.4	0.64	4.6	572
Bracket/deck – projection	Nut	M10	1	26	2.6	19	
Bracket/deck – handgrip	Bolt	M8	2	5.2	0.52	3.8	
Handgrip – deck	Nut	M8	2	5.2	0.52	3.8	
Seat bracket – deck	Nut	M8	2	15	1.5	11	
Battery box/stay – holder	Nut	M6	2	8.9	0.89	6.4	
Battery box – deck/bracket	Nut	M8	2	13	1.3	9.4	
Battery box – electrical box	Bolt	M8	1	13	1.3	9.4	
Battery box/stay – electrical box	Nut	M8	2	13	1.3	9.4	
Extension bolt – negative battery terminal	—	M6	1	6.4	0.64	4.6	
Exhaust outlet – hull	Bolt	M6	3	6.4	0.64	4.6	
Hose screw clamp	—	—	3	3.7	0.37	2.7	
Sponson – hull	Bolt	M8	6	18	1.8	13	
Spout – hull	Nut	M24	1	5.4	0.54	3.9	
Rope hole – hull	Nut	M24	2	5.4	0.54	3.9	
Bow eye – hull	Bolt	M6	2	13	1.3	9.4	
Flap – hull	Bolt	M6	8	7.4	0.74	5.4	
Drain plug/packing – hull	Nut	—	4	2.0	0.2	1.4	
Engine mount – hull	Bolt	M8	8	17	1.7	12	271
Engine damper – hull	Bolt	M6	4	6.4	0.64	4.6	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torques			Remarks
				N•m	kgf•m	ft•lb	
Electrical							
Cover – electrical box	Tapping screw	ø6	11	4.9	0.49	3.5	
Lead retainer – electrical box	Tapping screw	ø6	2	4.9	0.49	3.5	
Positive battery lead – starter relay	Bolt	M6	1	3.4	0.34	2.5	
Starter motor lead – starter relay	Bolt	M6	1	3.4	0.34	2.5	
Rectifier/regulator – electrical box	Tapping screw	ø6	2	3.9	0.39	2.8	
Coupler bracket – electrical box	Tapping screw	ø6	2	3.4	0.34	2.5	
Wire harness retainer – electrical box	Tapping screw	ø6	2	4.9	0.49	3.5	
Ignition coil #1, # 2, #3 – electrical box	Tapping screw	ø6	6	3.9	0.39	2.8	
Fuse holder stay – electrical box	Tapping screw	ø6	1	3.4	0.34	2.5	
Main and fuel pump relay – electrical box	Tapping screw	ø6	1	3.9	0.39	2.8	
Ground leads – electrical box	Bolt	M6	2	7.6	0.76	5.5	
ECM – hull	Nut	—	2	5.4	0.54	3.9	
Slant detection switch – hull	Nut	—	2	5.4	0.54	3.9	
Nut/spring washer/washer (starter motor lead terminal) – starter motor	Nut	—	1	8.8	0.88	6.4	
Starter motor rear cover/starter motor yoke – starter motor front cover	Bolt	M5	2	6.4	0.64	4.6	
YPVS servomotor bracket – deck	Nut	—	3	15	1.5	11	
YPVS servomotor/ throttle cable plastic tie bracket – YPVS servomotor bracket	Nut	—	2	5.4	0.54	3.9	

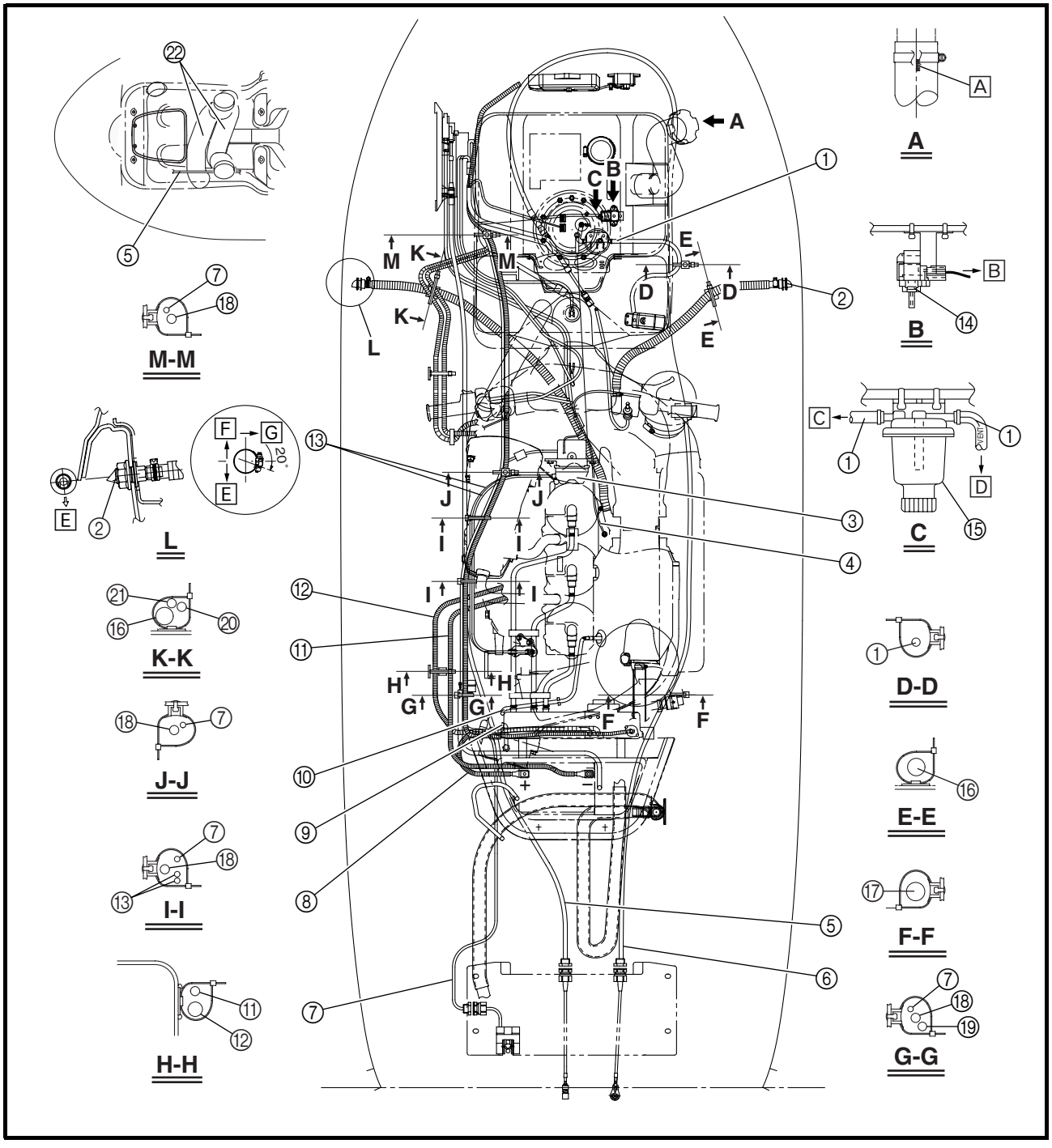
Nut Ⓐ	Bolt Ⓑ	General torque specifications		
		N•m	kgf•m	ft•lb
8 mm	M5	5.0	0.5	3.6
10 mm	M6	8.0	0.8	5.8
12 mm	M8	18	1.8	13
14 mm	M10	36	3.6	25
17 mm	M12	43	4.3	31



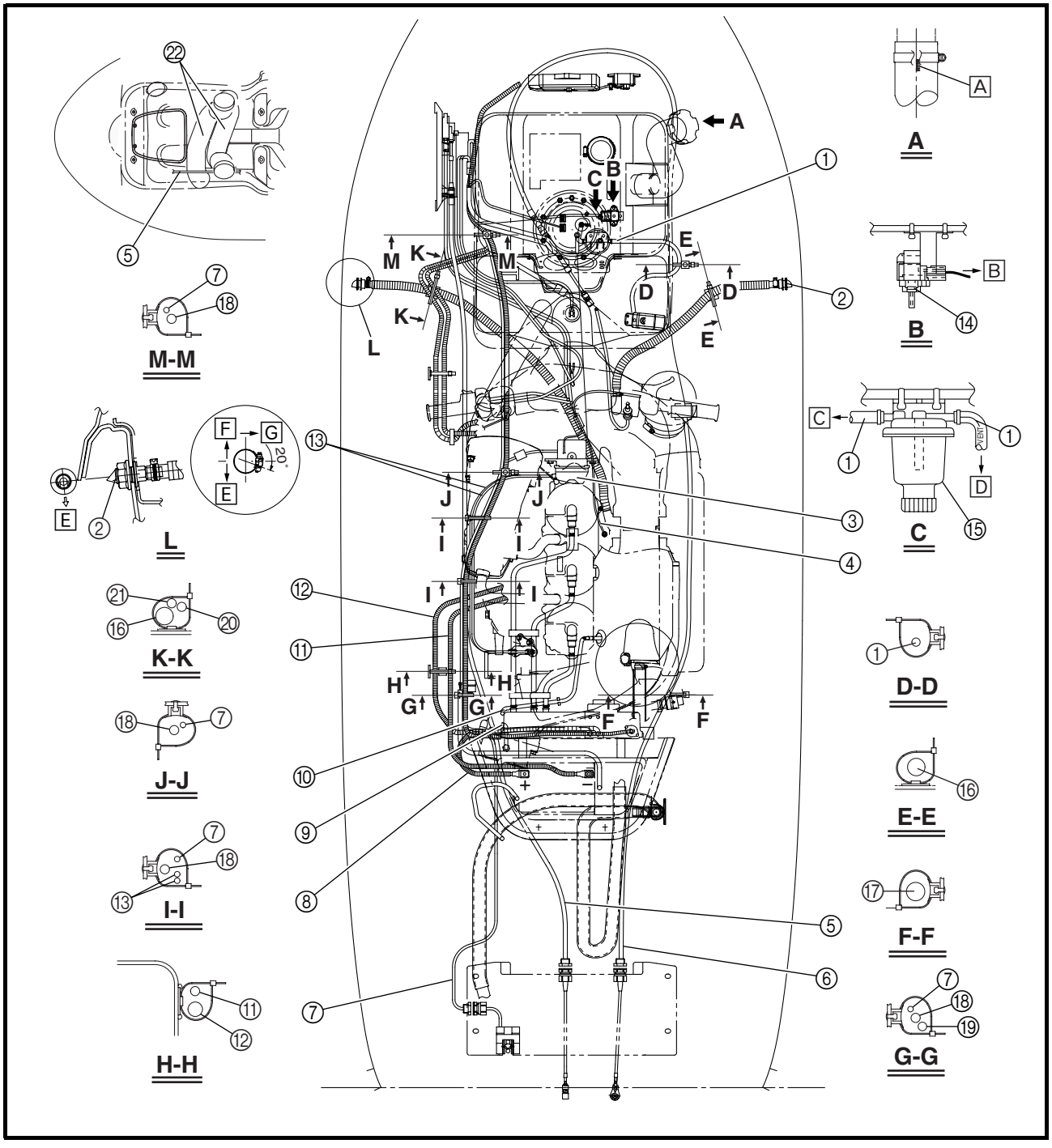
GENERAL TORQUE

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided in applicable sections of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads.
Components should be at room temperature.

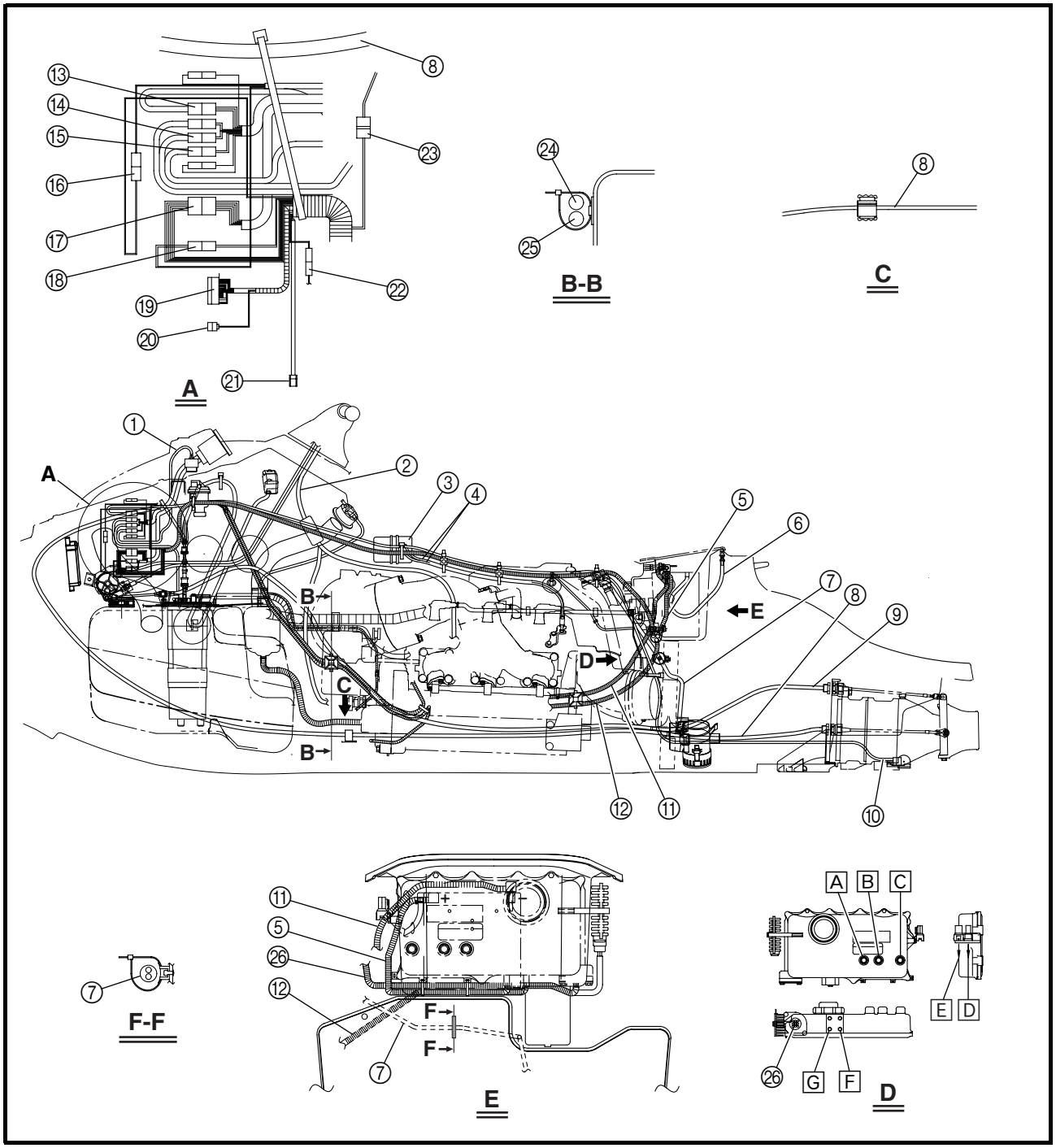
CABLE AND HOSE ROUTING



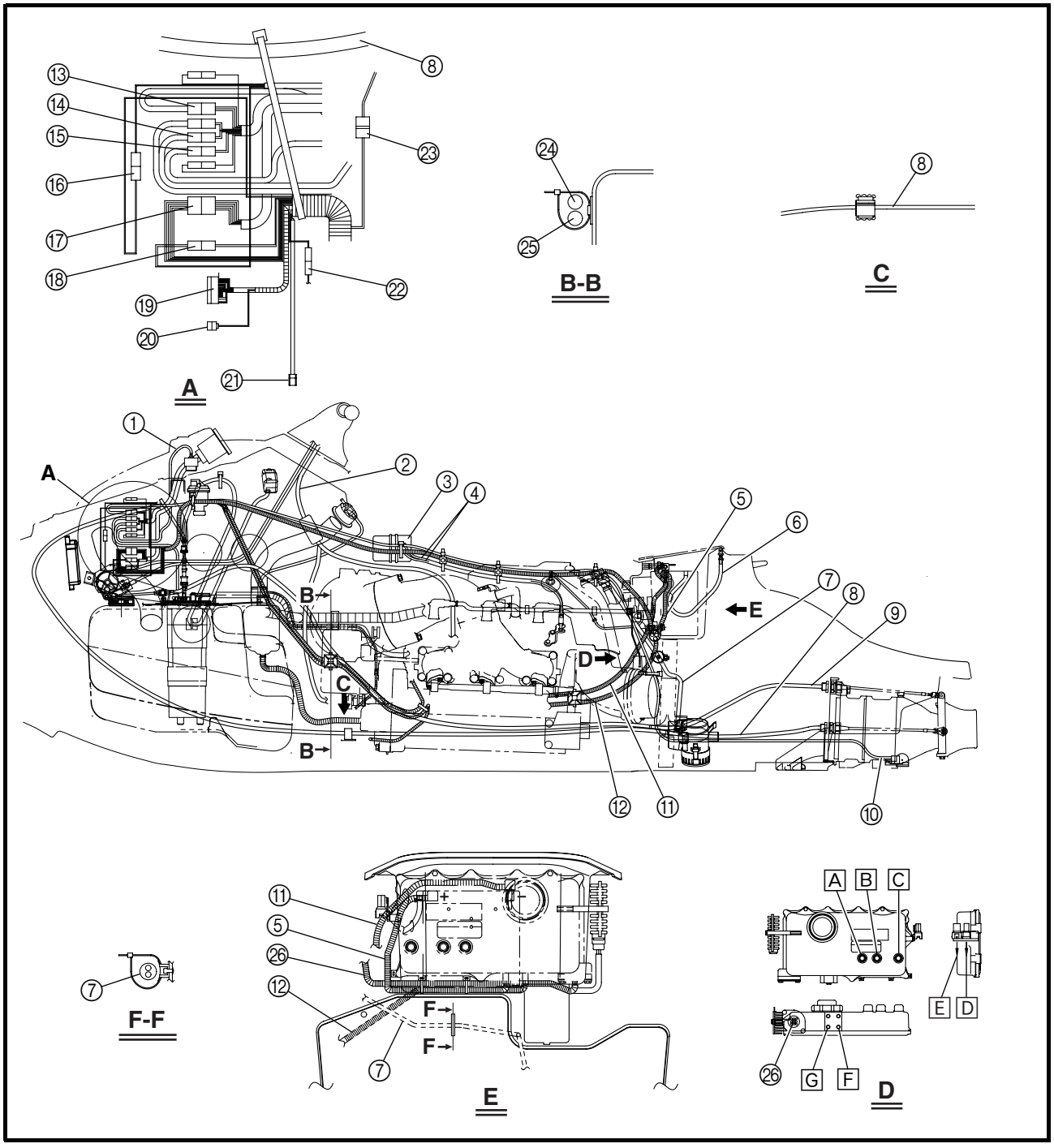
① Fuel tank breather hose
② Cooling water pilot outlet
③ YPVS servomotor
④ Throttle cable
⑤ QSTS cable
⑥ Steering cable
⑦ Speed sensor lead
⑧ Positive battery lead
⑨ Cooling water temperature sensor lead
⑩ Exhaust temperature sensor lead
⑪ Negative battery lead
⑫ Starter motor lead
⑬ YPVS cables
⑭ Atmospheric pressure sensor
⑮ Water separator
⑯ Cooling water pilot outlet hose
⑰ Cooling water outlet hose
⑱ Wire harness
⑲ Electrical bilge pump lead
⑳ Wire harness (generator)
㉑ Wire harness (throttle bodies)
㉒ Ventilation hose



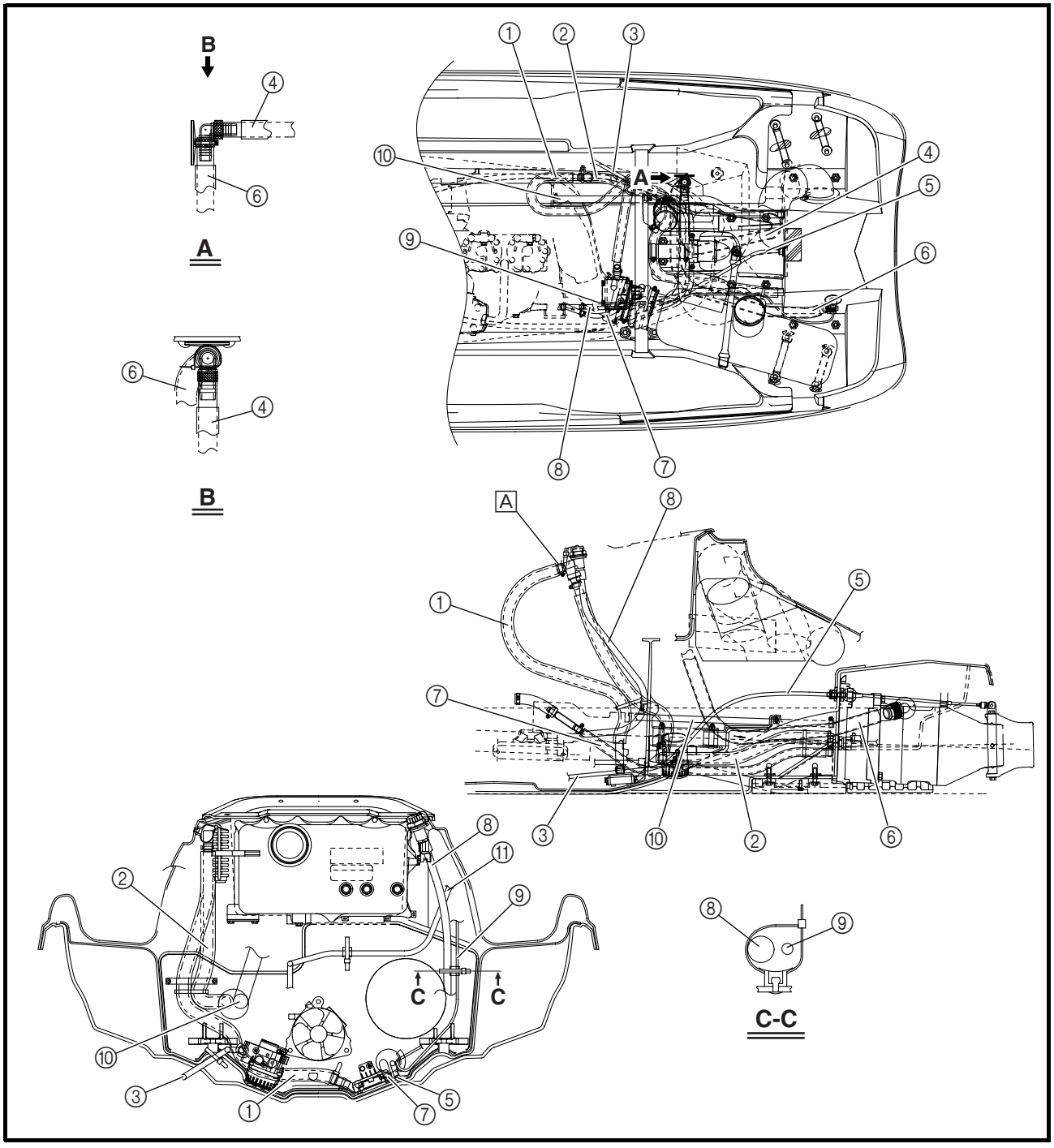
A Align the parting line on the fuel filler neck with the lot mark on the fuel filler hose.
B To wire harness
C To ventilation socket
D To fuel tank
E Down
F Up
G Bow



① Buzzer lead
② Throttle cable
③ YPVS servomotor
④ YPVS cables
⑤ Positive battery lead
⑥ Battery breather hose
⑦ Electrical bilge pump lead
⑧ Steering cable
⑨ QSTS cable
⑩ Speed sensor lead
⑪ Negative battery lead
⑫ Starter motor lead
⑬ Speed sensor coupler
⑭ Oil level sensor coupler
⑮ Buzzer coupler
⑯ Engine stop switch coupler
⑰ Multifunction meter coupler
⑱ Start switch coupler
⑲ ECM coupler
⑳ Slant detection switch
㉑ Fuel pump coupler
㉒ Atmospheric pressure sensor coupler
㉓ Steering switch coupler
㉔ Wire harness (generator)
㉕ Wire harness (throttle bodies)
㉖ Wire harness

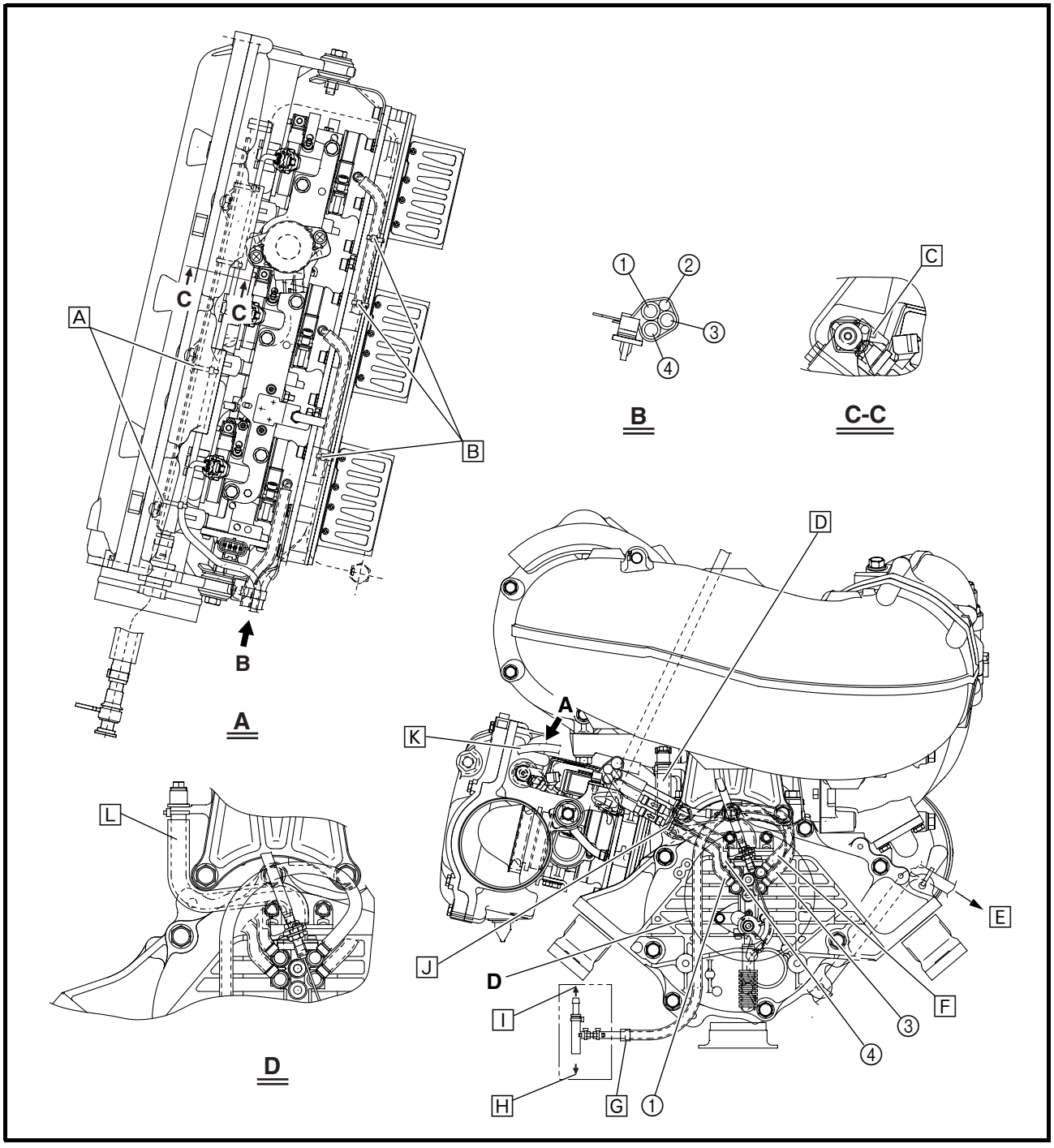


A To cylinder #3
B To cylinder #2
C To cylinder #1
D Cooling water temperature sensor
E Exhaust temperature sensor
F To positive battery terminal
G To starter motor



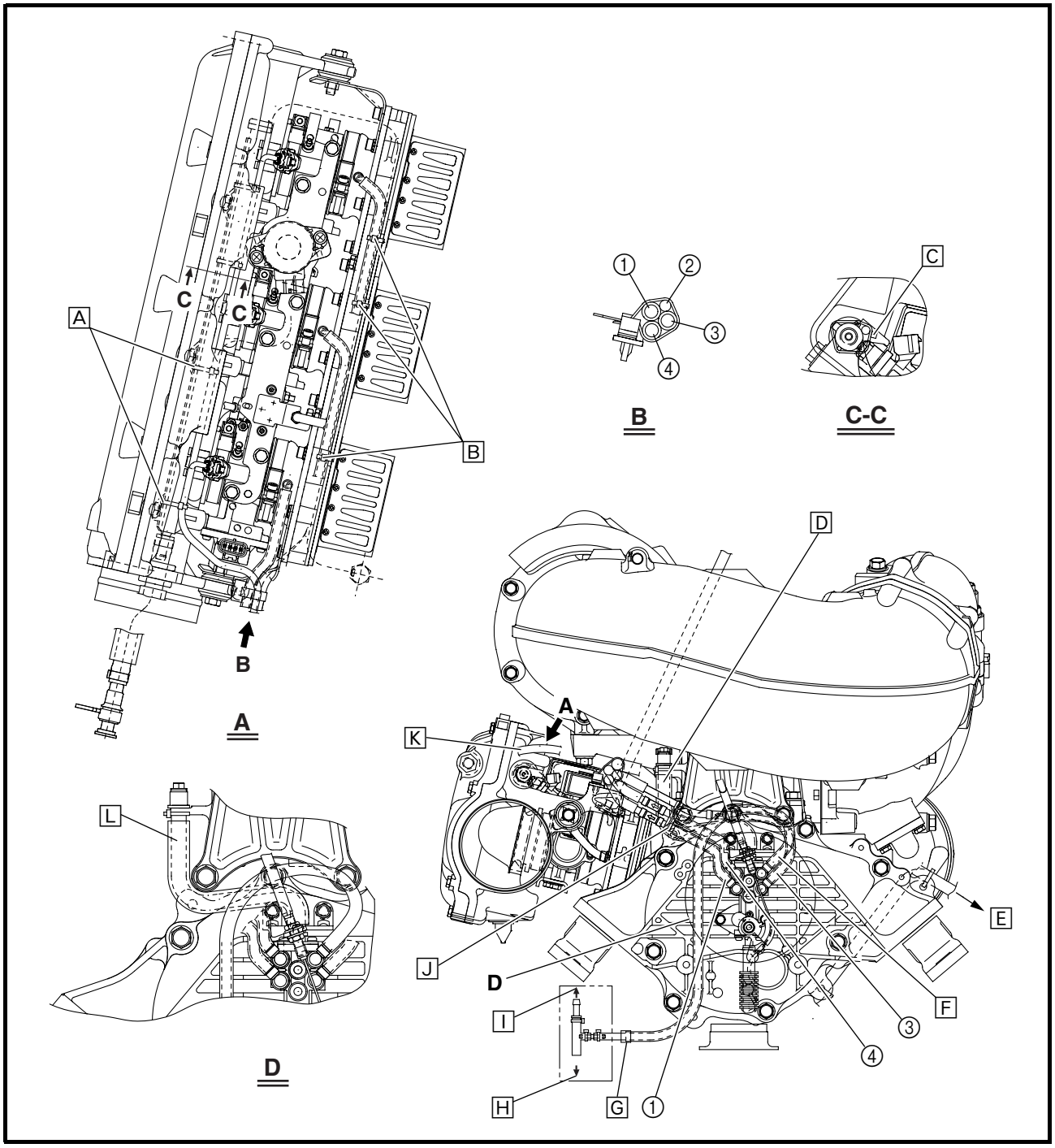
① Bilge hose 1
② Bilge hose 2
③ Steering cable
④ Bilge hose 3
⑤ QSTS cable
⑥ Bilge hose 4
⑦ Cooling water hose (cooling water inlet)
⑧ Flushing hose
⑨ Speed sensor lead
⑩ Cooling water hose (cooling water outlet)
⑪ Electrical bilge pump lead

[A] Contact the corrugated tube (bilge hose 1) to the hose screw clamp.

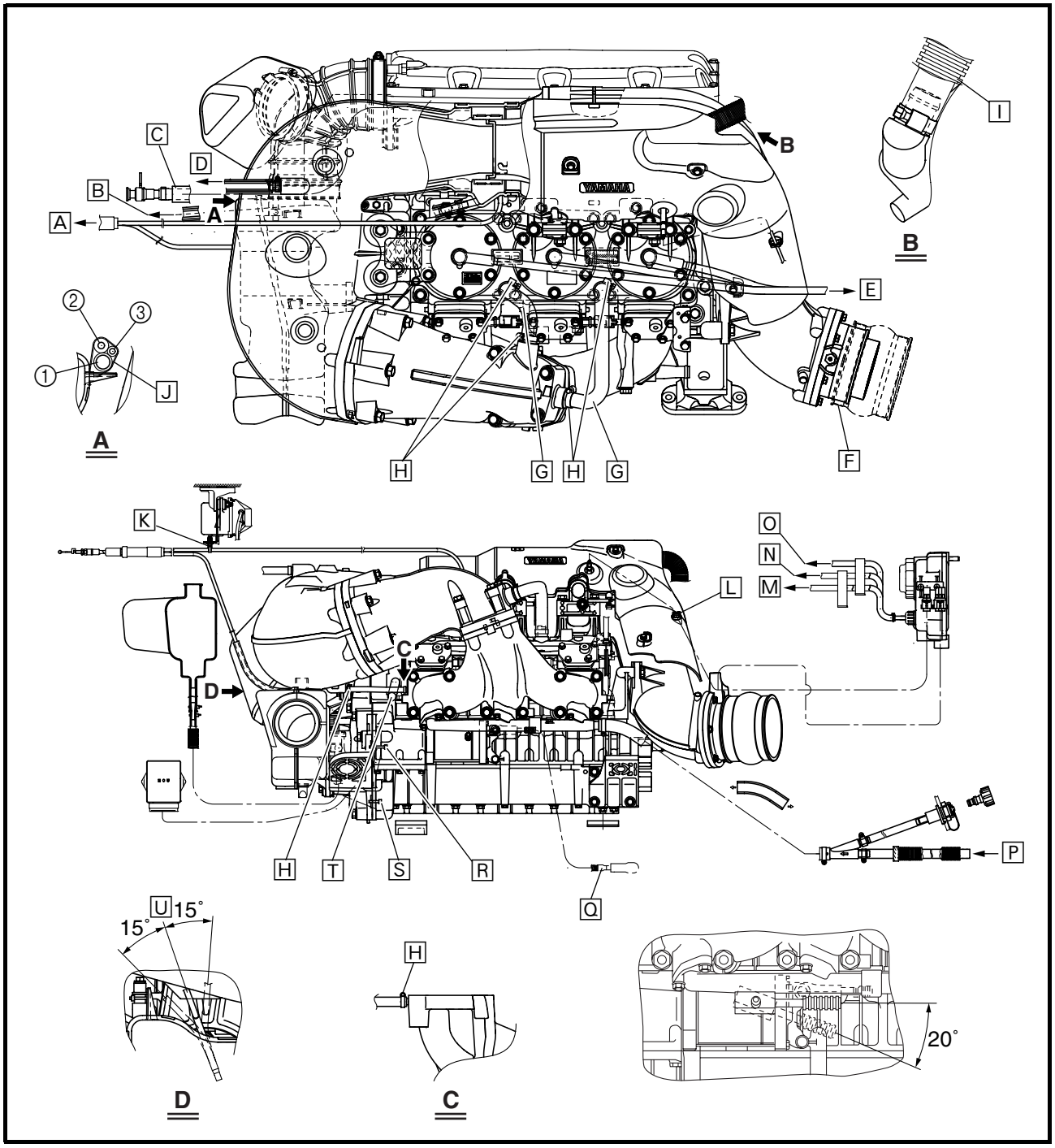


① Oil delivery hose #1
② Sub-wire harness
③ Oil delivery hose #3
④ Oil delivery hose #2

A Pass the plastic tie through the holes of the rib on the fuel rail.
B Fasten oil delivery hoses #2 and #3 and the engine temperature sensor lead with a plastic tie.
C Fasten the sub-wire harness with the plastic tie on the rib of the fuel rail. Be sure to position the plastic tie so that the fastener is visible from the outside.
D Pass the oil bleed hose on the inside of the oil pump cable.
E To ECM
F Pass the oil return hose on the outside of the oil pump cable.

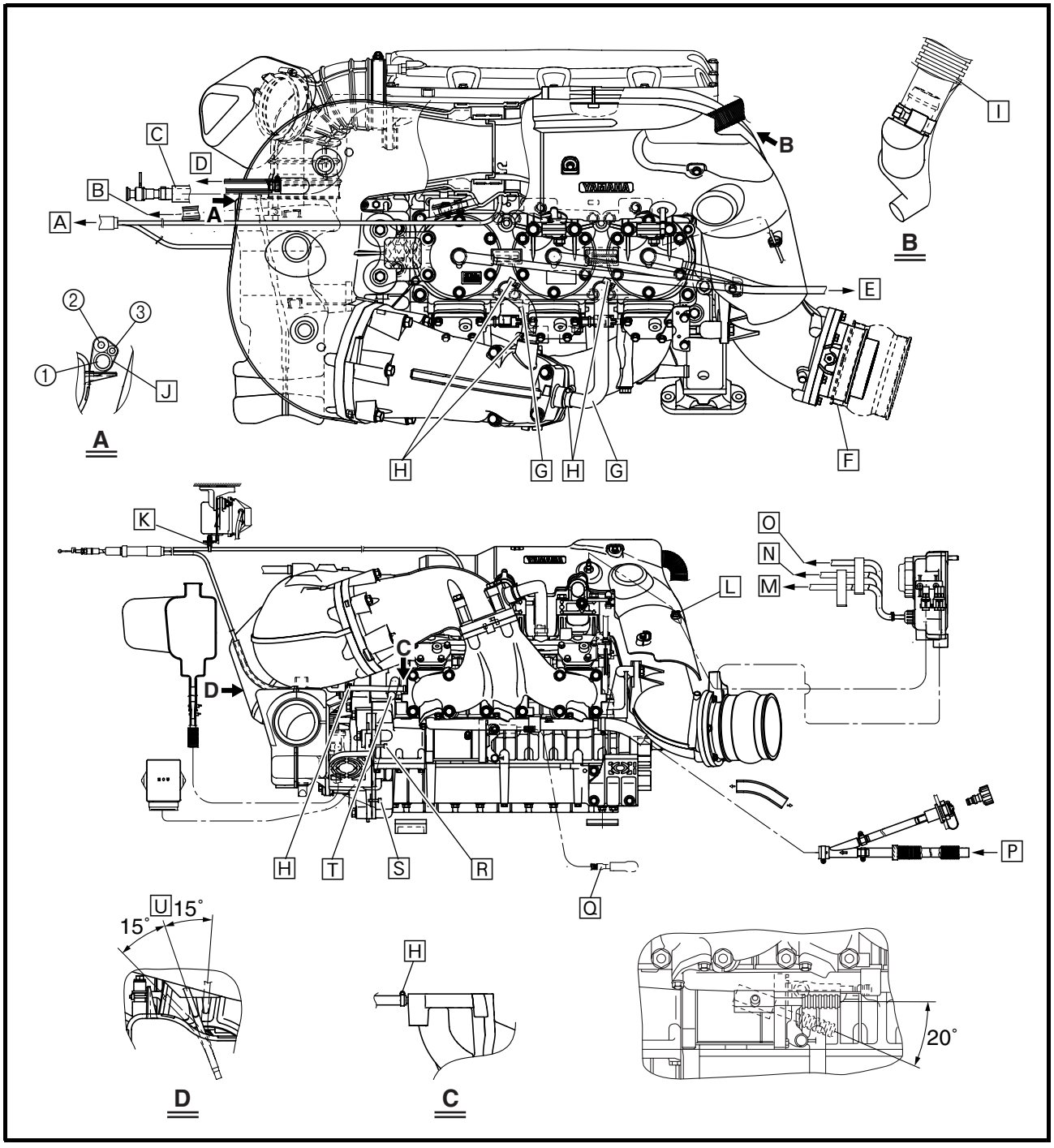


G Push the corrugated tube toward the oil pump, and then tape it.
H To oil tank
I To check valve
J Install the oil hoses into the hose holders so that the holders do not cover the check valve clips.
K Pass the intake air temperature sensor lead over the fuel hose.
L Pass the bleed hose under the exhaust chamber bracket. Be sure to install the L-shaped bleed hose toward the oil pump.



① Cooling water hose
(cooling water pilot outlet on port side)
② Fuel hose
③ Oil return hose

A To throttle lever
B To cooling water pilot outlet on port side
C When fastening the corrugated tube of the fuel hose to the intake silencer, slide it toward the fuel pump, and then tighten it with a plastic tie.
D To cooling water pilot outlet on starboard side
E To electrical box
F Install the exhaust joint so that it contacts the stoppers on the muffler assembly.
G Face the red mark end of the cooling hose toward the cylinder head cover, and then install the hose.
H Install the hose screw clamps in the direction shown.



I Contact the corrugated tube to the hose screw clamp (muffler assembly end).
J Strongly pull the plastic tie.
K After installing the YPVS servomotor, fasten the throttle cable.
L Fasten the exhaust temperature sensor lead.
M To cylinder #1
N To cylinder #2
O To cylinder #3
P Cooling water inlet
Q Install the white tape end of the negative battery lead to the battery.
R Fasten the sub-wire harness and wire harness (generator).
S Fasten the wire harness (generator).
T Route the sub-wire harness under the cooling water hose.
U Install the oil pump cable to the angle shown in the illustration.

CHAPTER 3
PERIODIC INSPECTION AND ADJUSTMENT

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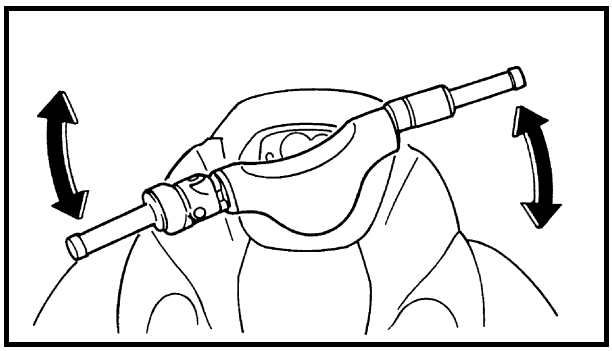
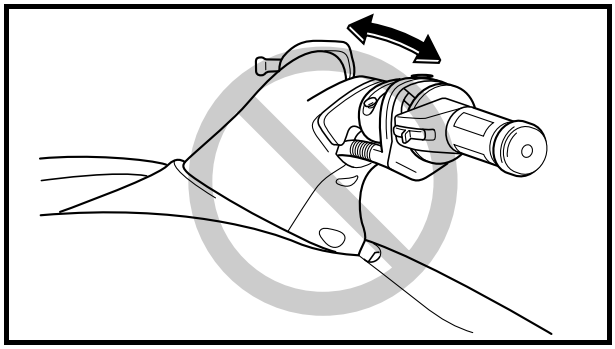
MAINTENANCE INTERVAL CHART

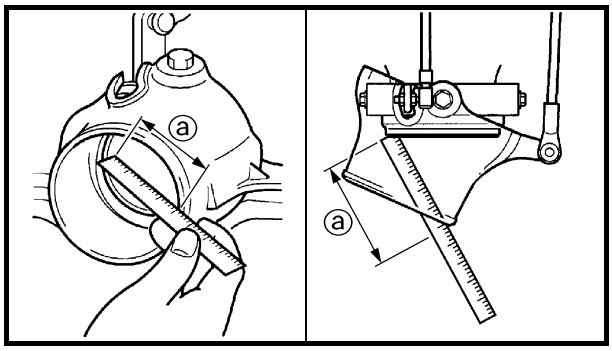
Use the following chart as a guide to general maintenance.
Adjust the maintenance intervals according to the operating conditions of the watercraft.

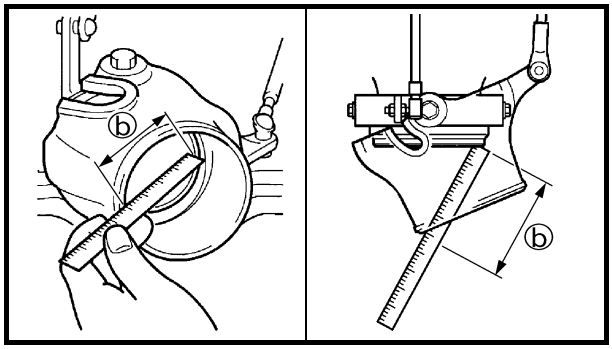
ITEM \ MAINTENANCE INTERVAL		INITIAL			THEREAFTER EVERY		PAGE
		10 hours	50 hours	100 hours	100 hours	200 hours	
			6 months	12 months	12 months	24 months	
Spark plug	Inspect, clean, adjust	○		○	○		3-9
Lubrication points	Lubricate			○	○		3-17
Intermediate housing	Lubricate	○ *1		○ *2	○ *2		3-19
Fuel system	Inspect			○	○		3-7
Fuel tank	Clean					○	3-7
Oil injection system	Inspect, clean	○				○	3-8
Throttle shaft	Inspect			○	○		—
Cooling water passages	Flush	○ *3					—
Water inlet strainer	Inspect, clean			○	○		3-15
Bilge strainer	Clean			○	○		3-16
Electric bilge pump strainer	Inspect, clean			○	○		3-16
Impeller	Inspect	○ *4		○	○		3-15
Jet thrust nozzle angle	Inspect			○	○		3-2
QSTS mechanism	Inspect, adjust	○ *4		○	○		3-4
Throttle lever	Check operation	○ *4					3-3
Throttle cable	Inspect, adjust			○	○		3-3
Stern drain plugs	Inspect, replace	○ *4		○	○		3-17
Battery	Inspect	○ *5		○	○		3-12
Rubber coupling	Inspect					○	—
Engine mount	Inspect					○	5-15
Nuts and bolts	Inspect	○		○	○		—

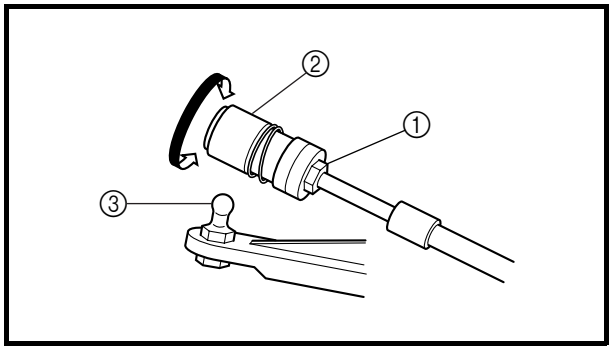
*1 Grease quantity: 33.0–35.0 cm^3 (1.11–1.18 oz)
*2 Grease quantity: 6.0–8.0 cm^3 (0.20–0.27 oz)
*3 After each use
*4 Before each use
*5 Check the electrolyte level before each use.











PERIODIC SERVICE

CONTROL SYSTEM

Steering column inspection

1. Check:
   - Steering column
     Excessive play → Replace the steering column.
     Refer to “STEERING COLUMN” in Chapter 8.

Checking steps:
- Move the handlebar up and down and back and forth.
- Check the excessive play of the handlebar.

Steering cable inspection and adjustment

1. Measure:
   - Jet thrust nozzle distances ⓐ and ⓑ
     Difference → Adjust.

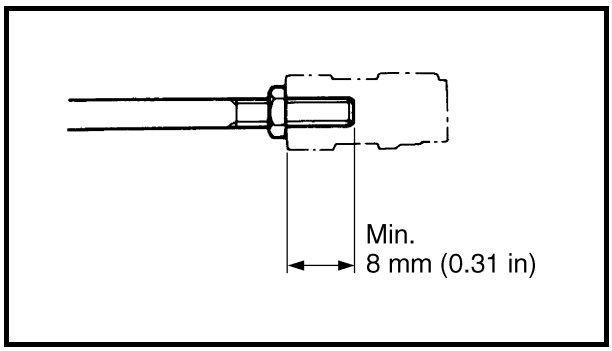
Difference of distances ⓐ and ⓑ:
Maximum 5 mm (0.2 in)

Measurement steps:
- Set the control grip to the neutral position.
- Turn the handlebar lock to lock.
- Measure distances ⓐ and ⓑ.
- If the difference of distances ⓐ and ⓑ is not within specification, adjust the cable joint.

2. Adjust:
   - Steering cable joint
     (steering column end)

Adjustment steps:
- Set the control grip to the neutral position.
- Loosen the locknut ①.
- Disconnect the steering cable joint ② from the ball joint ③.
- Turn the cable joint in or out to adjust distances ⓐ and ⓑ.

Turn in	**Distance ⓐ is increased.**
Turn out	**Distance ⓑ is increased.**



⚠ WARNING

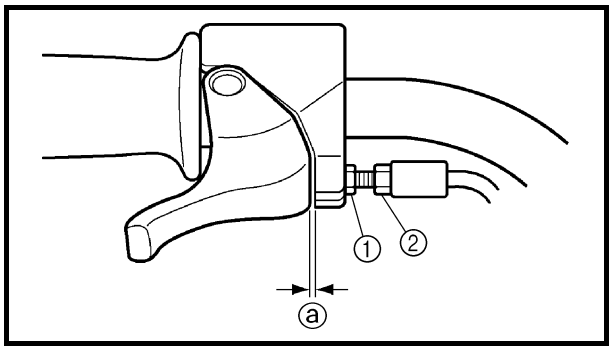
The cable joint must be screwed in a minimum of 8 mm (0.31 in).

- Connect the cable joint, and then tighten the locknut.

Locknut:
6.8 N • m (0.68 kgf • m, 4.9 ft • lb)

NOTE:

If the steering cable cannot be properly adjusted by the cable joint at the steering column end, adjust the cable joint at the jet pump end so that the specified distance is obtained. Refer to "REMOTE CONTROL CABLES AND SPEED SENSOR LEAD" in Chapter 8.



Throttle cable inspection and adjustment

1. Measure:
   - Throttle lever free play ⓐ
     Out of specification → Adjust.

Throttle lever free play:
4–7 mm (0.16–0.28 in)

2. Adjust:
   - Throttle lever free play

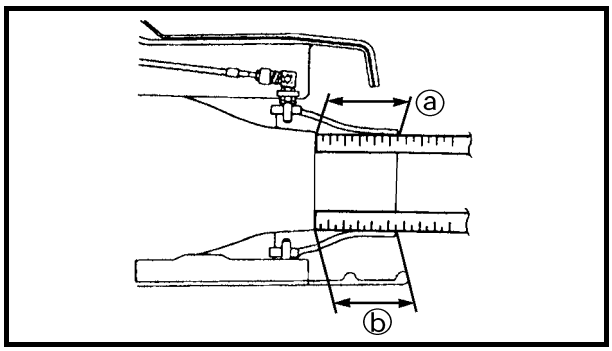
Adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the specified free play is obtained.

Turn in	**Free play is increased.**
Turn out	**Free play is decreased.**

- Tighten the locknut.

⚠ WARNING

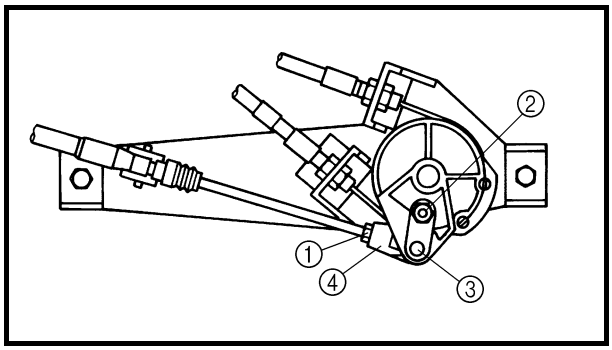
After adjusting the free play, turn the handlebar to the right and left and make sure that the trolling speed does not increase.



QSTS cable inspection and adjustment

1. Measure:
   - Jet thrust nozzle set lengths ⓐ and ⓑ
     Out of specification → Adjust.

Measurement steps:
- Set the control grip to the neutral position.
- Set the jet thrust nozzle in the center position.
- Measure jet thrust nozzle set lengths ⓐ and ⓑ.
- If lengths ⓐ and ⓑ are not even, adjust the cable joint.



2. Adjust:
   - QSTS cable

Adjustment steps:
- Set the control grip to the neutral position.
- Loosen the locknut ①.
- Remove the nut ② and pivot pin ③.
- Set the jet thrust nozzle in the center position.
- Turn the cable joint ④ in or out to adjust lengths ⓐ and ⓑ.

Turn in	**Length ⓑ is increased.**
Turn out	**Length ⓐ is increased.**

⚠ WARNING

The cable joint must be screwed in a minimum of 8 mm (0.31 in).

- Connect the cable joint ④ and pivot pin ③, and then tighten the nut ②.

Nut:
3.8 N • m (0.38 kgf • m, 2.7 ft • lb)

- Tighten the locknut ①.

Locknut:
4 N • m (0.4 kgf • m, 2.9 ft • lb)

NOTE:
If the QSTS cable cannot be properly adjusted by the cable joint at the QSTS converter end, adjust the cable joint at the jet pump end so that the same lengths are obtained. Refer to "REMOTE CONTROL CABLES AND SPEED SENSOR LEAD" in Chapter 8.

Trolling speed check

NOTE:
The trolling speed of this model is adjusted automatically by the ECM according to the operating conditions of the watercraft. Therefore, it is not necessary to adjust the trolling speed.

1. Measure:
   - Trolling speed
     Out of specification → Proceed to step 2.

	Trolling speed: **1,250–1,450 r/min**

Checking steps: (watercraft in water)
- Start the engine and warm it up for a few minutes at 4,000–4,500 r/min to stabilize the trolling speed.
- Measure the trolling speed.

2. If the trolling speed is out of specification, check the following.
   If no malfunctions are found after performing all of the checks, replace the throttle bodies.
   - Check the spark plugs.
     Refer to "Spark plug inspection."
   - Check the throttle cable and oil pump cable.
     Refer to "Throttle cable inspection and adjustment."
     Refer to "OIL PUMP" in Chapter 4.
   - Check the intake passages.
     Refer to "INTAKE DUCT AND INTAKE SILENCER" in Chapter 4.
     Refer to "REED VALVES" in Chapter 5.
     Refer to "HOSES" in Chapter 8.

- Check the exhaust passages.
  Refer to “MUFFLER ASSEMBLY” in Chapter 5.
  Refer to “EXHAUST CHAMBER ASSEMBLY” in Chapter 5.
  Refer to “EXHAUST MANIFOLD” in Chapter 5.
  Refer to “EXHAUST SYSTEM” in Chapter 8.
- Measure the fuel pressure.
  Refer to “Fuel pressure measurement” in Chapter 4.
- Check the fuel for deterioration, the fuel tank for water accumulation, the fuel lines for clogs or kinks, and the fuel injectors for clogs.
  Refer to “FUEL SYSTEM.”
  Refer to “FUEL TANK AND FUEL PUMP MODULE” in Chapter 4.
  Refer to “FUEL INJECTION SYSTEM” in Chapter 4.
- Measure the compression pressure.
  Refer to “COMPRESSION PRESSURE MEASUREMENT” in Chapter 5.
- Check the jet pump and impeller.
  Refer to “JET PUMP UNIT” in Chapter 6.
- Check the diagnostic codes in the “Diagnosis Record” and check for any malfunctions using the “Static Test” and “Active Test” of the Yamaha Diagnostic System.
  Refer to “INTRODUCTION” in Chapter 9.

FUEL SYSTEM

⚠ WARNING

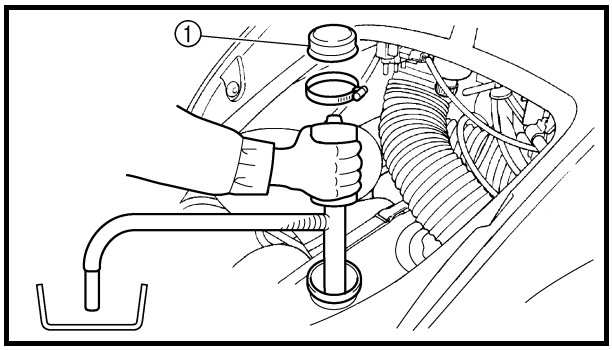
When removing fuel system parts, wrap them in a cloth and take care that no fuel spills into the engine compartment.

Fuel line inspection

1. Check:
   - Fuel pump filter
     Clog/contaminants → Clean.
     Refer to "FUEL TANK AND FUEL PUMP MODULE" in Chapter 4.
   - Fuel hoses
     Cracks/damage → Replace.
   - O-rings (quick connector)
     Cracks/damage → Replace the quick connector.
   - Fuel pipe
     Cracks/damage → Replace the fuel pump.
     Refer to "FUEL INJECTION SYSTEM" in Chapter 4.
   - Fuel filler hose
   - Fuel filler cap
     Cracks/damage → Replace.
2. Check:
   - Fuel tank
     Cracks/damage → Replace.
     Water accumulation → Remove.

NOTE:

To remove water from the fuel tank, remove the cap ① and use a siphon pump.



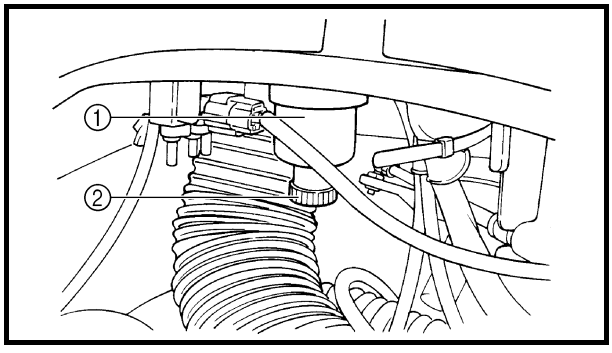
Fuel tank cap screw clamp:
1.3 N • m (0.13 kgf • m, 0.9 ft • lb)

Water separator inspection

1. Check:
   - Water separator ①
     Water accumulation → Drain.

NOTE:

To drain water from the water separator, remove the drain plug ②.



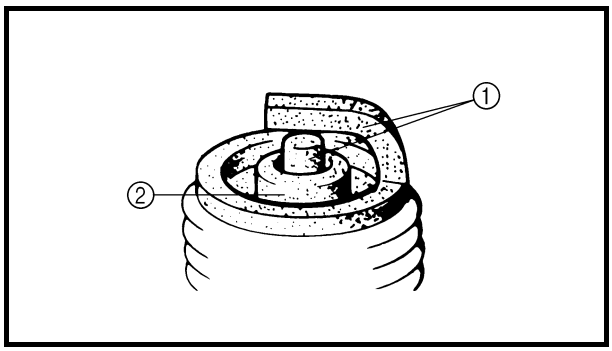
OIL INJECTION SYSTEM

Oil line inspection

1. Check:
   - Oil filter
     Contaminants → Clean.
     Frays/tears → Replace.
   - Rubber seal
     Cracks/wear → Replace.
   - Oil hoses
   - Oil tank
   - Oil filler cap
     Cracks/damage → Replace.
   - Check valve
     Malfunction → Replace.

CAUTION:

Do not allow the oil tank to become completely empty. If the oil tank becomes empty the oil injection pump must be bled to ensure proper oil flow, otherwise engine damage may occur. Refer to "OIL PUMP" in Chapter 4.



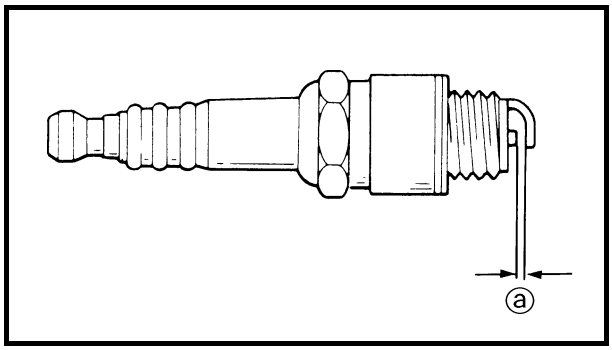
POWER UNIT

Spark plug inspection

1. Check:
   - Electrodes ①
     Damage/wear → Replace.
   - Insulator color ②
     Distinctly different color → Check the condition of the engine.

Color guide:
Medium-to-light tan color:
Normal
Whitish color:
Lean air-fuel mixture
Air leakage
Incorrect settings
Blackish color:
Overly rich air-fuel mixture
Electrical malfunction
Excessive oil use
Defective spark plug

2. Clean:
   - Spark plug
     (using a spark plug cleaner or wire brush)



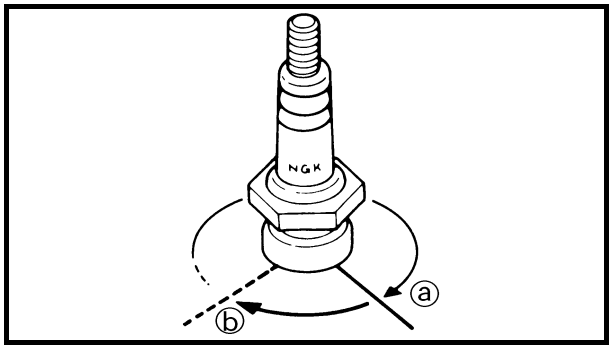
3. Measure:
   - Spark plug gap ⓐ
     Out of specification → Regap.

Spark plug gap:
1.0–1.1 mm (0.039–0.043 in)

4. Tighten:
   • Spark plugs

	Spark plug: **25 N • m (2.5 kgf • m, 18 ft • lb)**

NOTE:
- Before installing a spark plug, clean the gasket surface and spark plug surface. Also, it is suggested to apply a thin coat of anti-seize compound to the spark plug threads to prevent thread seizure.
- If a torque wrench is not available, a good estimate of the correct tightening torque for a new spark plug is to first finger tighten ⓐ the spark plug and then tighten it another 1/4 to 1/2 of a turn ⓑ.



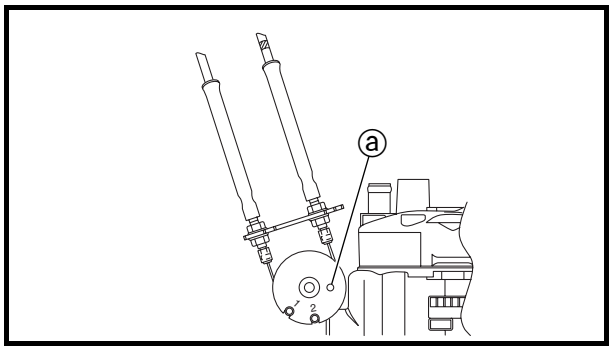
YPVS cable adjustment

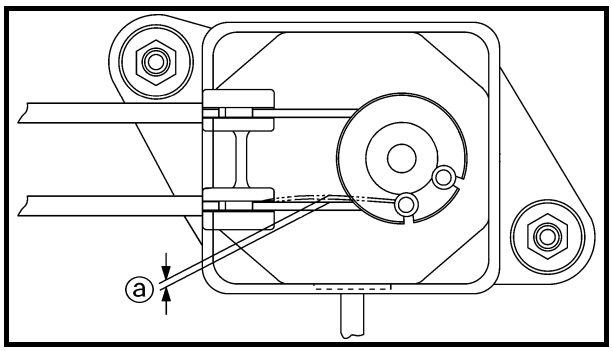
1. Check:
   • YPVS valve position
   Incorrect position → Adjust YPVS cables 1 and 2.

Checking steps:
- Start the engine, and then turn it off.

NOTE:
- Immediately after the engine stop switch is pushed, the YPVS valves extend and retract two times to clean the exhaust ports.
- If the engine is stopped without the engine stop switch being pushed, the YPVS valves extend and retract two times to clean the exhaust ports 30 seconds after the engine is stopped.

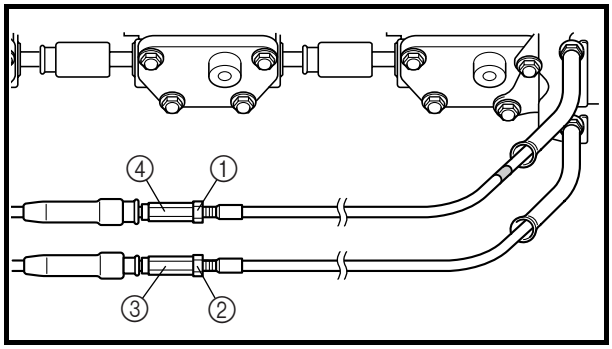
- Check that the hole ⓐ in the pulley is aligned with the hole in the cylinder when the YPVS valve is fully closed.





2. Measure:
   • YPVS cable slack ⓐ
   Out of specification → Adjust.

	YPVS cable slack: **0.5–1.5 mm (0.02–0.06 in)**

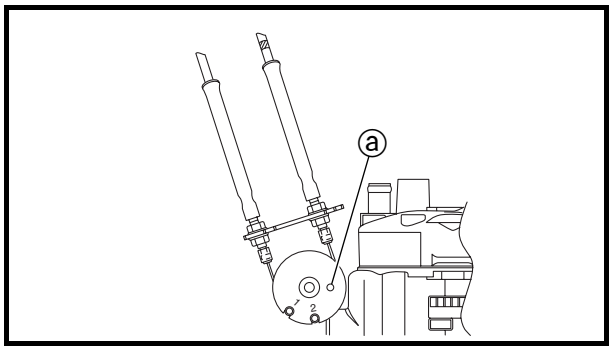


3. Adjust:
   • YPVS cables 1 and 2

Adjustment steps:
- Loosen locknuts ① and ②.
- Turn adjusters ③ and ④ in until there is slack in the cables.
- Align the hole ⓐ in the pulley with the hole in the cylinder.
- Insert a 4 mm (0.16 in) diameter pin through the pulley and cylinder holes.
- Turn adjusters ③ and ④ in or out until the specified slack is obtained.

Turn in	**Slack is increased.**
Turn out	**Slack is decreased.**

- Finger tighten locknuts ① and ②.
- Remove the pin.
- Start the engine, and then turn it off.
- Check the alignment of the holes.
- If the holes are aligned correctly, tighten the locknuts.
- If the holes are aligned incorrectly, repeat the adjustment steps.



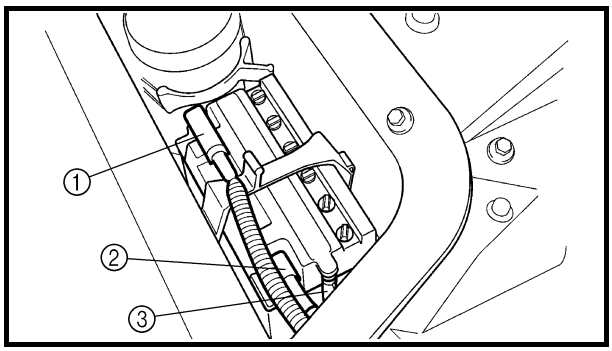
ELECTRICAL
Battery inspection

⚠ WARNING

- **Battery electrolyte is poisonous and dangerous, causing severe burns, etc. Electrolyte contains sulfuric acid. Avoid contact with skin, eyes or clothing.**
  Antidotes
  External: Flush with water.
  Internal: Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately.
  Eyes: Flush with water for 15 minutes and get prompt medical attention.
  Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc., well away. If using or charging the battery in an enclosed space, make sure that it is well ventilated. Always shield your eyes when working near batteries.
  KEEP OUT OF THE REACH OF CHILDREN.
- **Be sure to connect the breather hose to the battery. Fire or explosion could result if the breather hose is damaged, obstructed, or not connected properly.**

CAUTION:

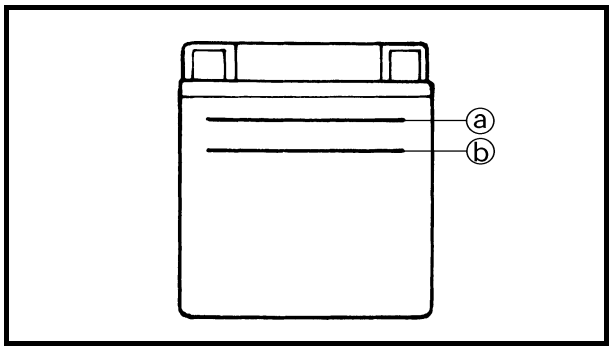
- **Be careful not to place the battery on its side.**
- **Be sure to remove the battery from the battery compartment when adding electrolyte or charging the battery.**
- **When checking the battery, make sure that the breather hose is connected to the battery and not obstructed.**



1. Remove:
   - Battery bands
   - Negative battery lead ①
   - Positive battery lead ②
   - Battery
   - Battery breather hose ③

⚠ WARNING

- **When removing the battery, disconnect the negative lead first.**
- **Remove the battery to prevent acid loss before turning the watercraft on its side to service the impeller, etc.**



2. Check:
   - Electrolyte level
     Low → Add distilled water.
     The electrolyte level should be between the maximum ⓐ and minimum ⓑ level marks.

Filling steps:

- Remove the filler caps.
- Add distilled water to the maximum level mark.
- Allow the battery to stand for 20 minutes. If the electrolyte level drops, add more distilled water until the level reaches the maximum level mark.

CAUTION:

Use only distilled water. Other types of water contain minerals which are harmful to batteries.

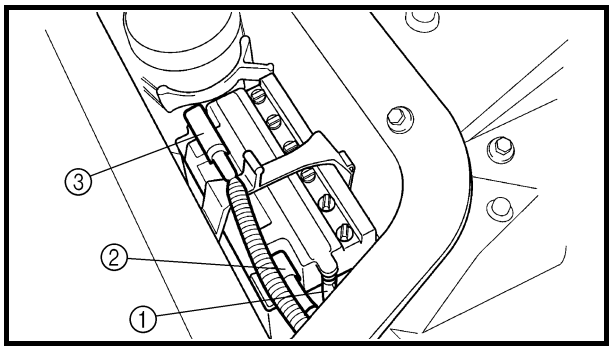
3. Check:
   - Specific gravity
     Out of specification → Charge.

Specific gravity at 20 °C (68 °F):
1.28
Charging current:
1.9 A × 10 h (68.4 kC)

4. Install:
   - Filler caps

CAUTION:

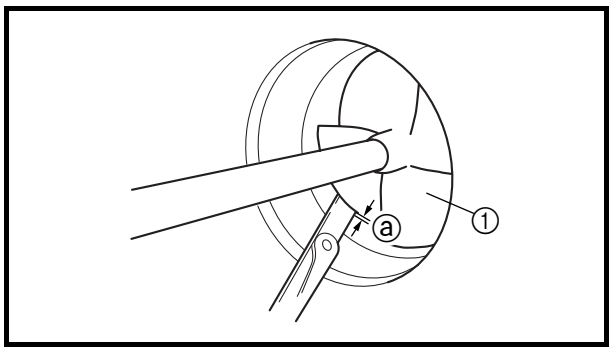
Before installing the battery, rinse off any electrolyte from the battery box or battery and make sure that the battery is dry.



5. Install:
   - Battery breather hose ①
   - Battery
   - Positive battery lead ②
   - Negative battery lead ③ (with terminal extension at negative battery terminal)
   - Battery bands

CAUTION:

- **Connect the positive lead to the battery terminal first.**
- **Make sure that the battery leads are connected properly. Reversing the leads can seriously damage the electrical system.**
- **Make sure that the battery breather hose is properly connected and is not obstructed.**
- **Coat the terminals with a water-resistant grease to minimize terminal corrosion.**



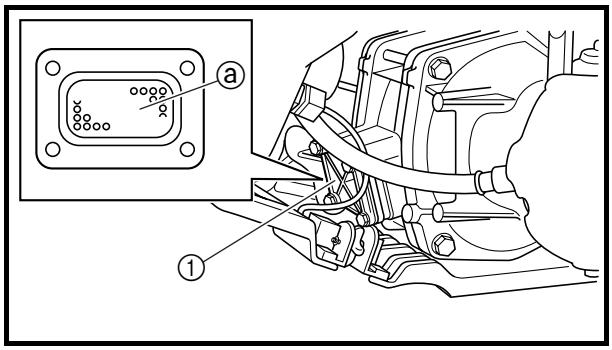
JET PUMP UNIT

Impeller inspection

1. Check:
   - Impeller ①
     Damage/wear → Replace.
     Nicks/scratches → File or grind.
2. Measure:
   - Impeller-to-housing clearance ⓐ
     Out of specification → Replace.

Maximum impeller-to-housing clearance:
0.9 mm (0.035 in)

Measurement steps:
- Disconnect the battery leads.
- Remove the intake grate and intake duct. Refer to "JET PUMP UNIT" in Chapter 6.
- Measure the clearance at each impeller blade as shown (a total of four measurements).
- Install the intake duct and intake grate. Refer to "JET PUMP UNIT" in Chapter 6.
- Connect the battery leads.

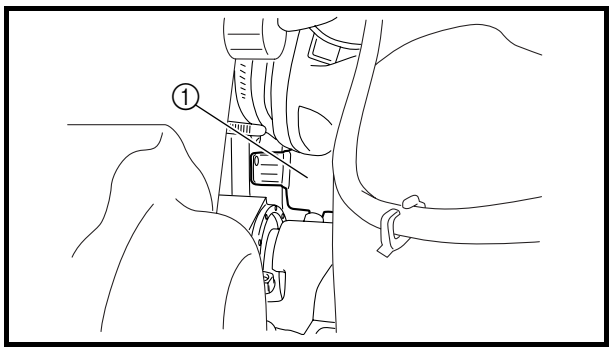


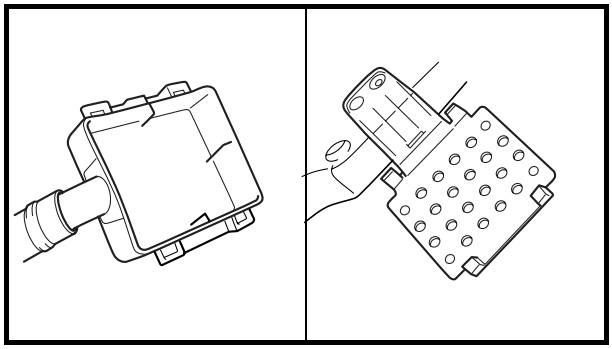
Water inlet strainer inspection

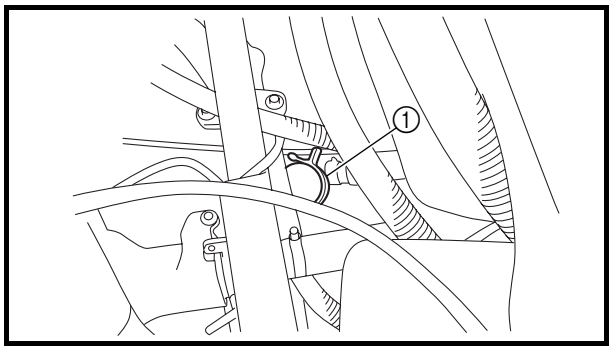
1. Check:
   - Water inlet strainer
     Contaminants → Clean.
     Cracks/damage → Replace.

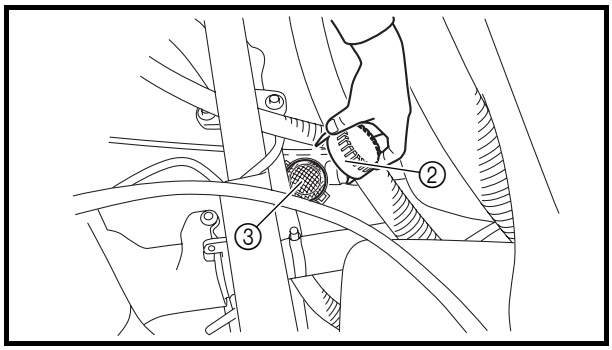
Checking steps:
- Remove the ride plate. Refer to "JET PUMP UNIT" in Chapter 6.
- Remove the water inlet cover ①.
- Check the water inlet strainer mesh ⓐ.
- Install the water inlet cover.
- Install the ride plate. Refer to "JET PUMP UNIT" in Chapter 6.

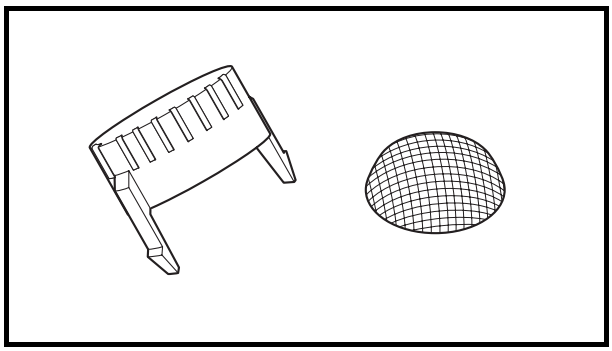
Water inlet cover bolt:
6.6 N • m (0.66 kgf • m, 4.8 ft • lb)
LOCTITE 572











BILGE PUMP

Bilge strainer inspection

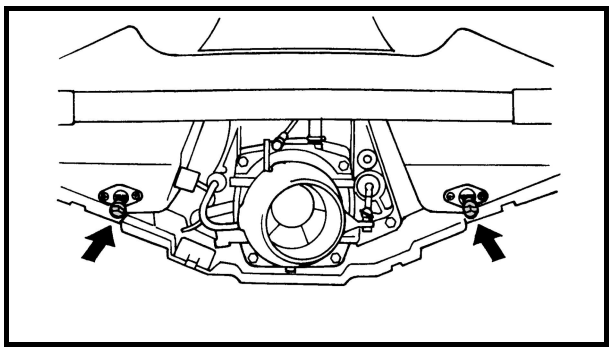
1. Check:
   - Bilge strainer
     Contaminants → Clean.
     Cracks/damage → Replace.

Checking steps:
- Remove the bilge strainer case ① from the bilge strainer.
- Check the bilge strainer and bilge strainer case.
- Install the bilge strainer case.

Electric bilge pump strainer inspection

1. Check:
   - Cap
   - Strainer
     Contaminants → Clean.

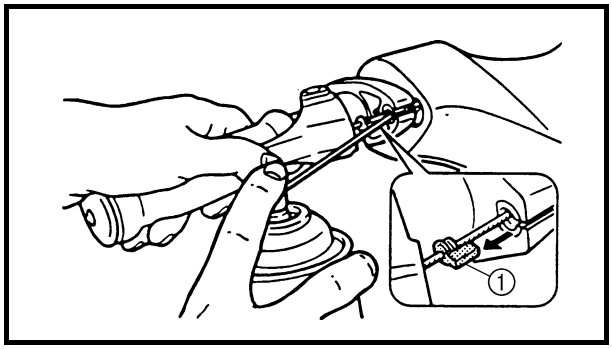
Checking steps:
- Remove the battery box.
  Refer to “BATTERY BOX” in Chapter 8.
- Remove the band ①.
- Remove the cap ② and strainer ③.
- Check the cap and strainer.
- Install the strainer and cap.
- Install the band.
- Install the battery box.
  Refer to “BATTERY BOX” in Chapter 8.



GENERAL

Drain plug inspection

1. Check:
   - Drain plugs
     Cracks/damage → Replace.
   - O-rings
     Cracks/wear → Replace.
   - Screw threads
     Contaminants → Clean.

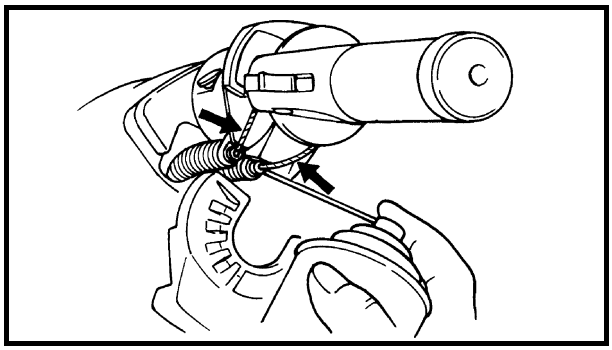


Lubrication points

1. Lubricate:
   - Throttle cable (handlebar end)

Recommended lubricant:
Rust inhibitor

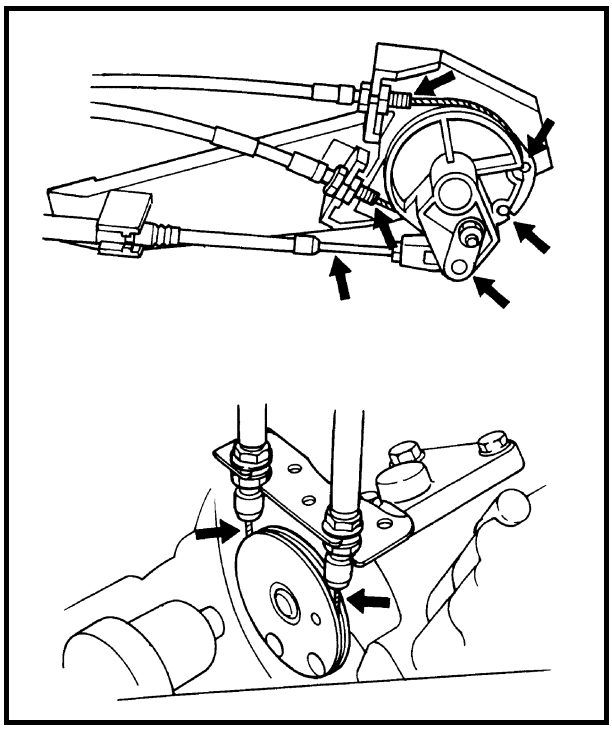
NOTE:
Before lubricating the throttle cable, squeeze the throttle lever and remove the rubber seal ①.



2. Lubricate:
   - QSTS control cables (handlebar end)

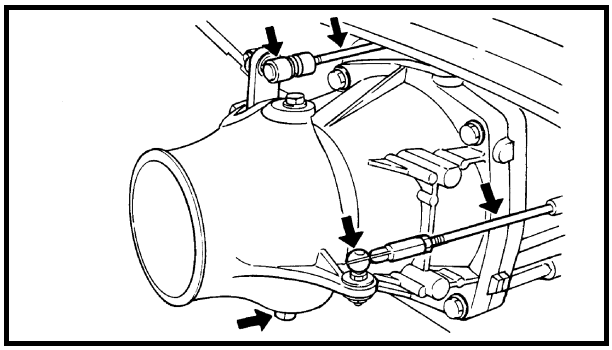
Recommended lubricant:
Yamaha marine grease,
Yamaha grease A
(water-resistant grease)

NOTE:
Before lubricating the QSTS control cables, remove the QSTS cable housing cover. Spray the rust inhibitor into the outer cables, and apply grease to the inner cables.



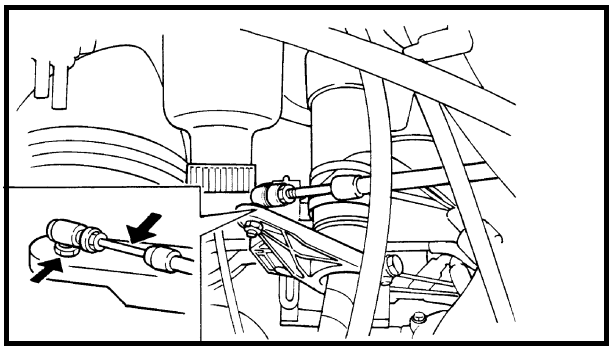
3. Lubricate:
   - QSTS cables (pulley end)
   - YPVS cables

Recommended grease:
Yamaha marine grease,
Yamaha grease A
(water-resistant grease)



4. Lubricate:
   - Nozzle pivot shaft
   - Steering cable (jet thrust nozzle end)
   - QSTS cable (jet thrust nozzle end)

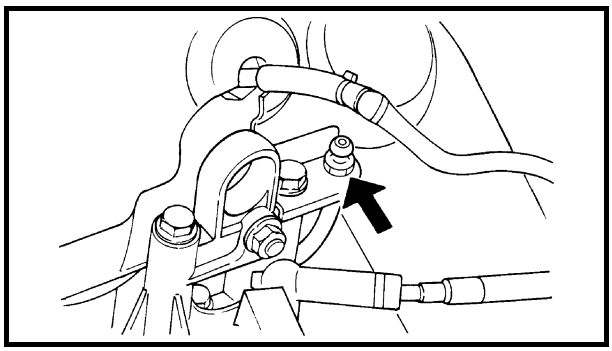
Recommended grease:
Yamaha marine grease,
Yamaha grease A
(water-resistant grease)



5. Lubricate:
   - Steering cable
   - Steering cable joint

NOTE:
Disconnect the steering cable joint, and then apply a small amount of grease to it.

Recommended grease:
Yamaha marine grease,
Yamaha grease A
(water-resistant grease)



6. Fill:
   - Intermediate housing

Recommended grease:
Yamaha marine grease,
Yamaha grease A
(water-resistant grease)
Grease quantity:
33.0–35.0 cm^3 (1.11–1.18 oz)

NOTE:
Using a grease gun, fill the intermediate housing with the recommended grease through the grease nipples.

CHAPTER 4
FUEL SYSTEM

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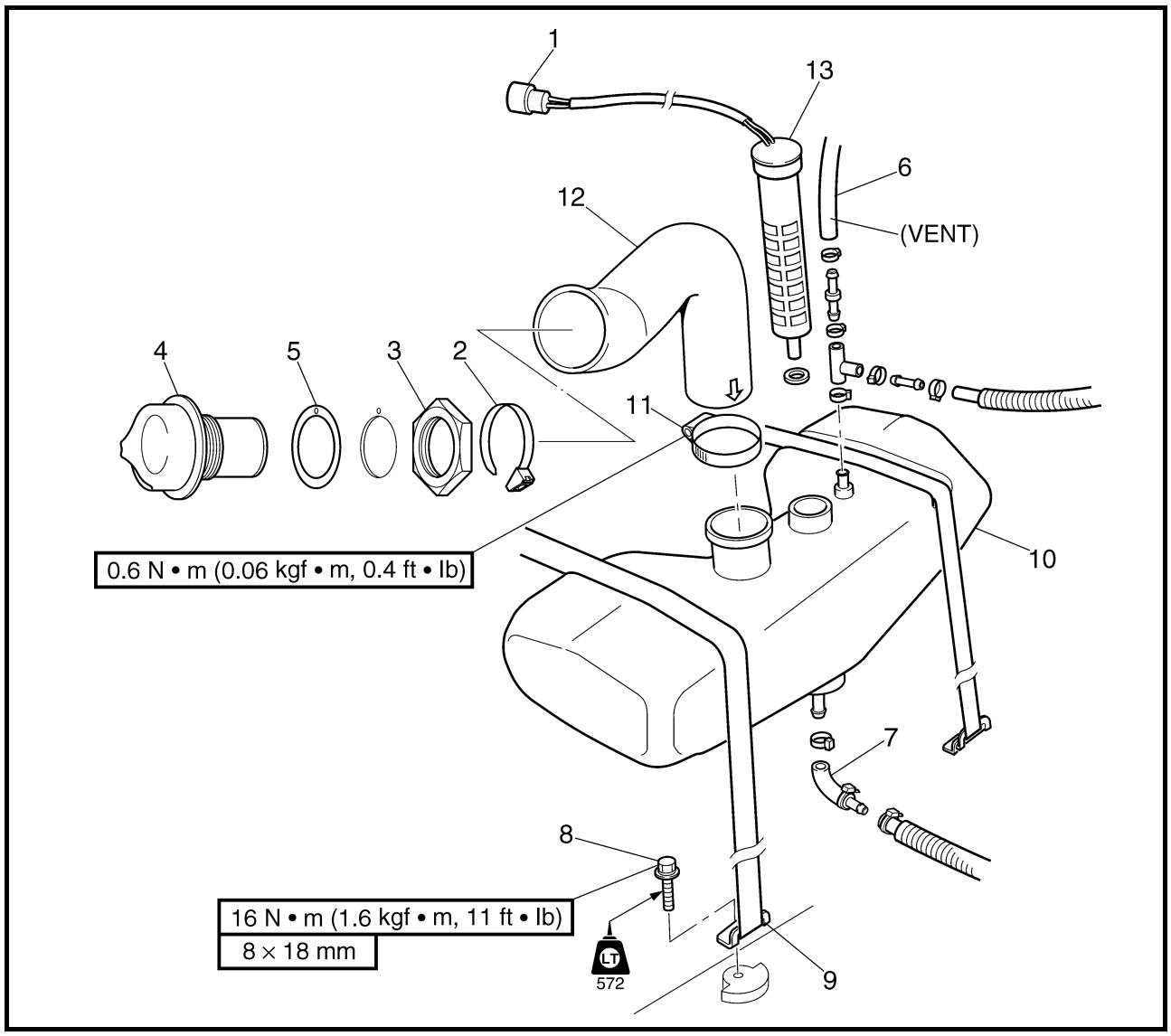
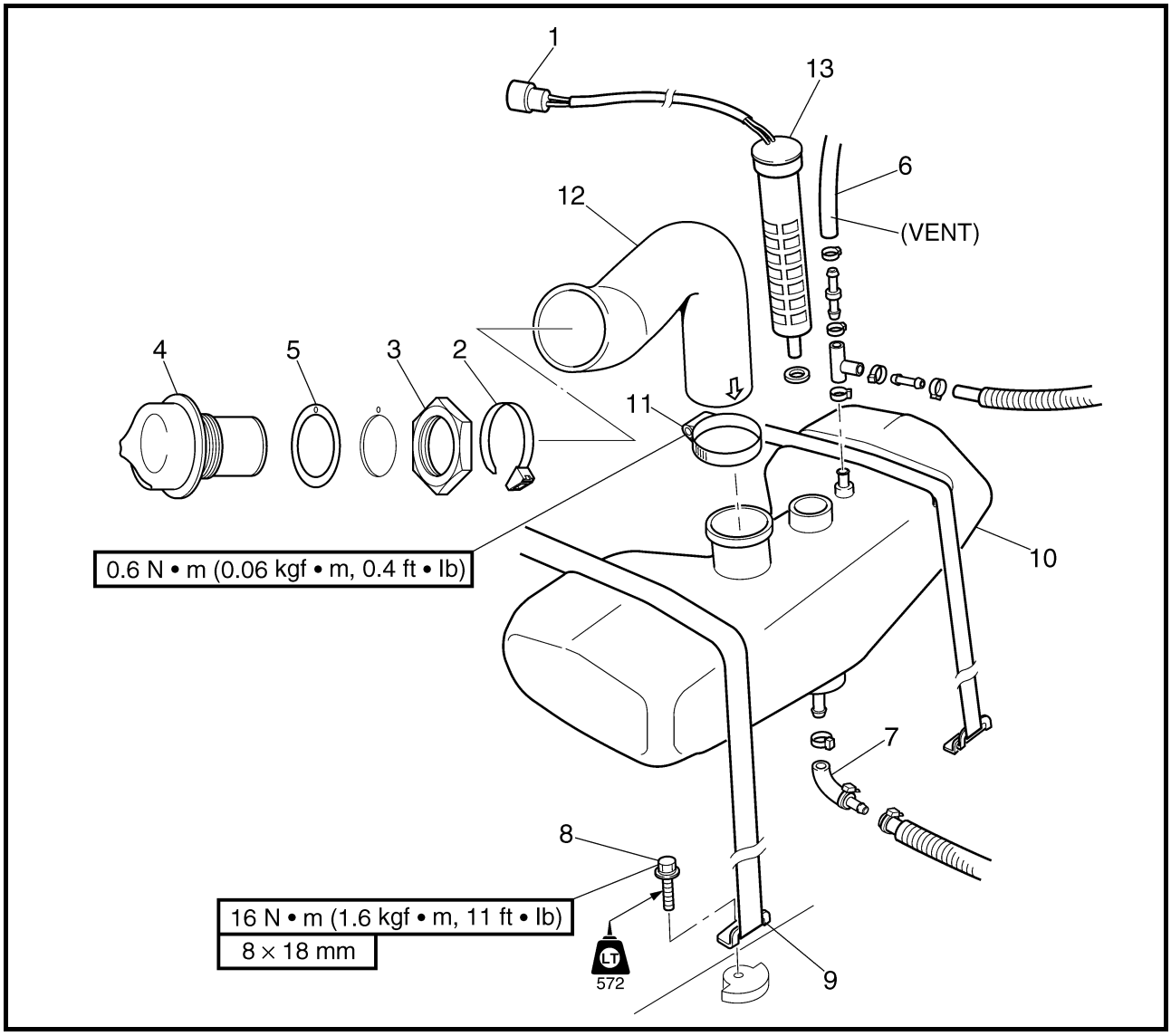
OIL TANK
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	OIL TANK REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT" in Chapter 5.
	Steering console cover assembly		Refer to "STEERING CONSOLE COVER" in Chapter 8.
1	Oil level sensor coupler	1	
2	Plastic tie	1	**Not reusable** Disconnect the oil filler hose from the oil filler neck.
3	Nut	1	
4	Oil filler neck	1	
5	Rubber seal	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Breather hose	1	
7	Oil hose	1	
8	Bolt	2	
9	Strap	2	
10	Oil tank	1	
11	Hose screw clamp	1	
12	Oil filler hose	1	
13	Oil level sensor	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Oil line inspection

1. Check:
   - Oil filter
     Contaminants → Clean.
     Frays/tears → Replace.
   - Rubber seal
     Cracks/wear → Replace.
   - Oil hoses
   - Oil filler cap
     Cracks/damage → Replace.
   - Check valve
     Faulty → Replace.

Oil level sensor inspection

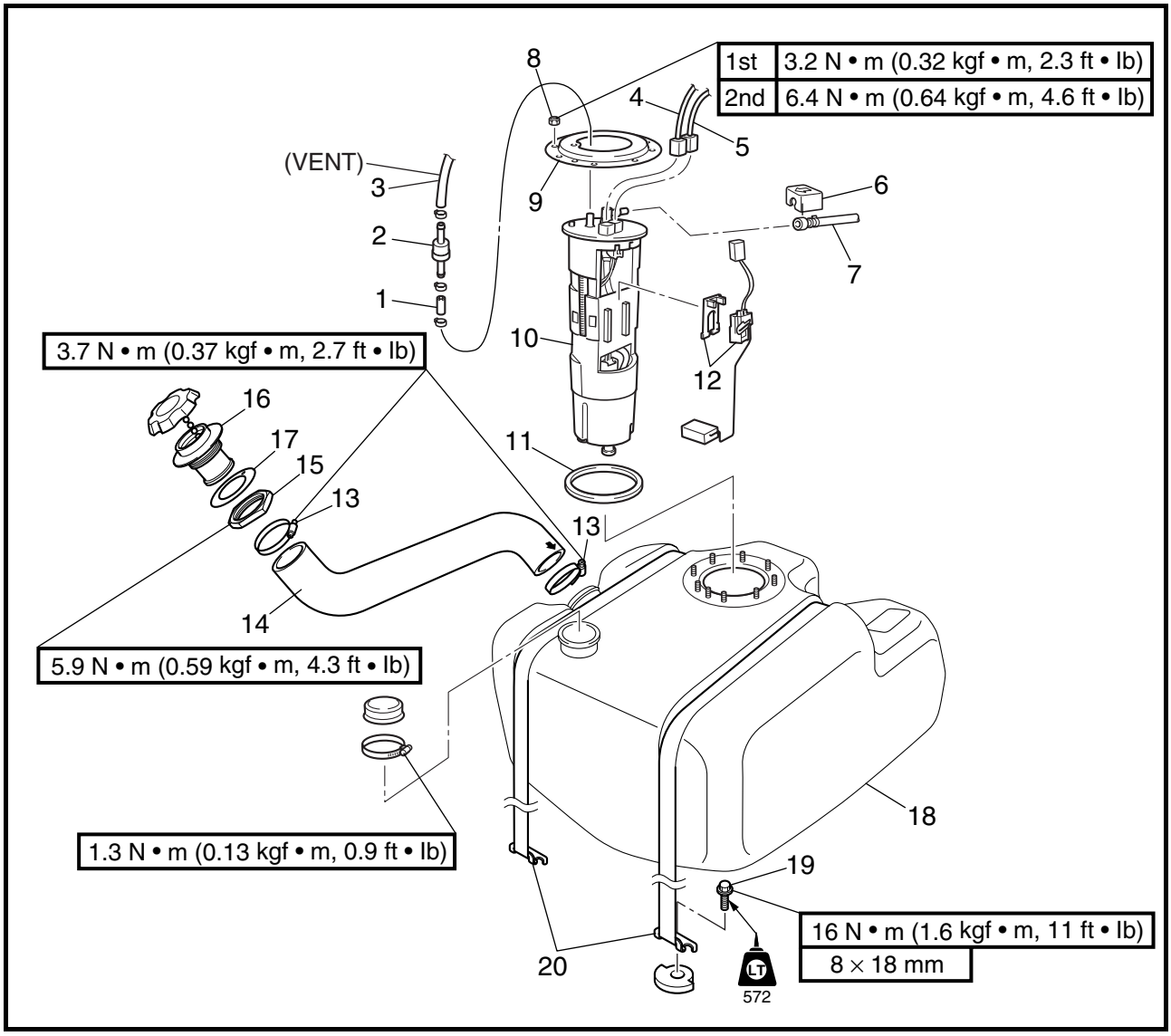
Refer to “INDICATION SYSTEM” in Chapter 7.

Oil tank inspection

1. Check:
   - Oil tank
     Cracks/damage → Replace.

FUEL TANK AND FUEL PUMP MODULE

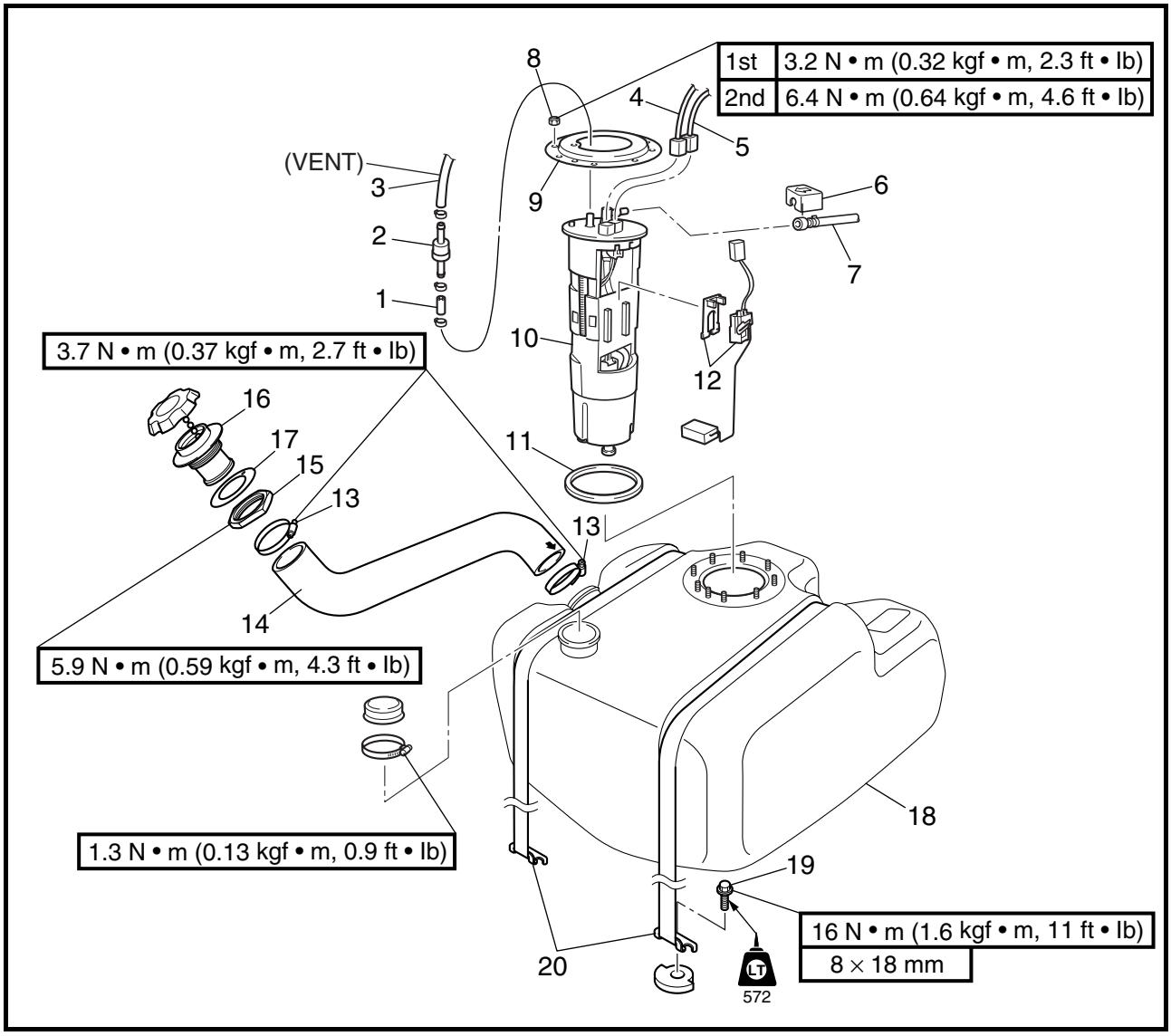
EXPLODED DIAGRAM


1st 3.2 N • m (0.32 kgf • m, 2.3 ft • lb)
2nd 6.4 N • m (0.64 kgf • m, 4.6 ft • lb)
(VENT)
3.7 N • m (0.37 kgf • m, 2.7 ft • lb)
5.9 N • m (0.59 kgf • m, 4.3 ft • lb)
1.3 N • m (0.13 kgf • m, 0.9 ft • lb)
16 N • m (1.6 kgf • m, 11 ft • lb)
8 × 18 mm
LT
572

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	FUEL TANK REMOVAL		Follow the left "Step" for removal.
	Oil tank		Refer to "OIL TANK."
1	Fuel tank breather hose	1	
2	Check valve	1	
3	Fuel tank breather hose	1	
4	Fuel sender coupler	1	**NOTE:**
5	Fuel pump module coupler	1	Make sure that the inner seal of the coupler is installed properly before connecting the coupler.

EXPLODED DIAGRAM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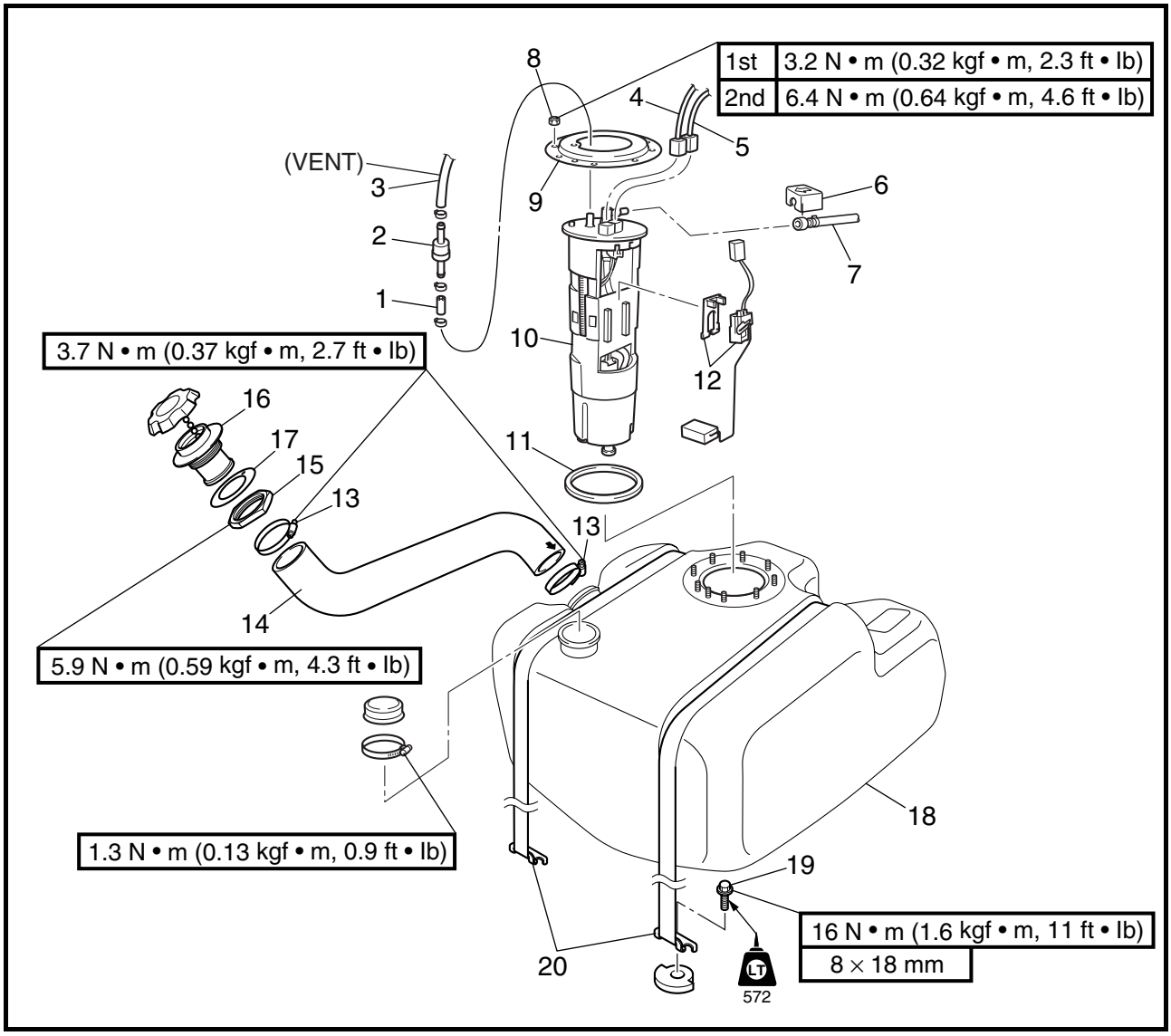
16 N • m (1.6 kgf • m, 11 ft • lb)
8 × 18 mm
LT
572

Step	Procedure/Part name	Q'ty	Service points
6	Cover	1	
7	Fuel hose	1	
8	Nut	9	
9	Retainer	1	
10	Fuel pump module	1	
11	Seal	1	
12	Fuel sender assembly	1	
13	Hose screw clamp	2	
14	Fuel filler hose	1	
15	Nut	1	
16	Fuel filler neck	1	

EXPLODED DIAGRAM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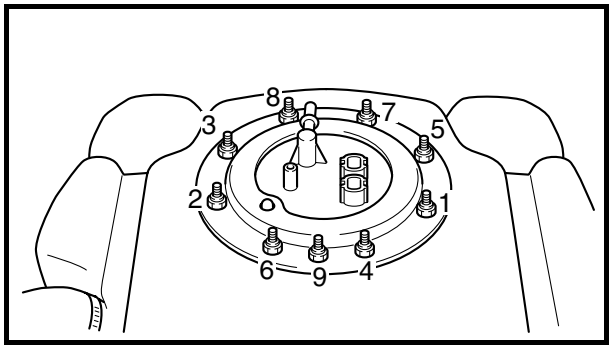
(VENT)
3.7 N • m (0.37 kgf • m, 2.7 ft • lb)
5.9 N • m (0.59 kgf • m, 4.3 ft • lb)
1.3 N • m (0.13 kgf • m, 0.9 ft • lb)
16 N • m (1.6 kgf • m, 11 ft • lb)
8 × 18 mm
LT
572

Step	Procedure/Part name	Q'ty	Service points
17	Rubber seal	1	
18	Fuel tank	1	
19	Bolt	2	
20	Strap	2	
			Reverse the removal steps for installation.

SERVICE POINTS

Fuel hose disconnection

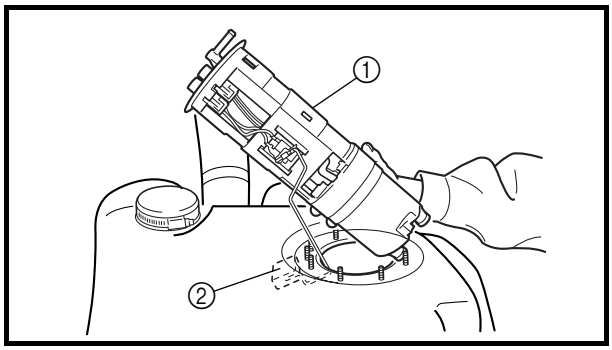
1. Disconnect:
   - Fuel hose
     Refer to “FUEL INJECTION SYSTEM.”



Fuel pump module removal

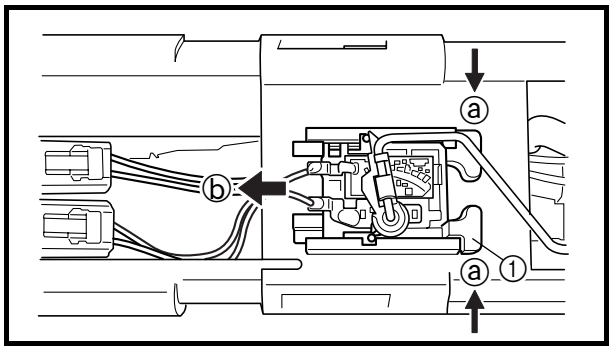
1. Remove:
   - Nuts
   - Retainer

NOTE:
Loosen the nuts in the sequence shown.



2. Remove:
   - Fuel pump module ①

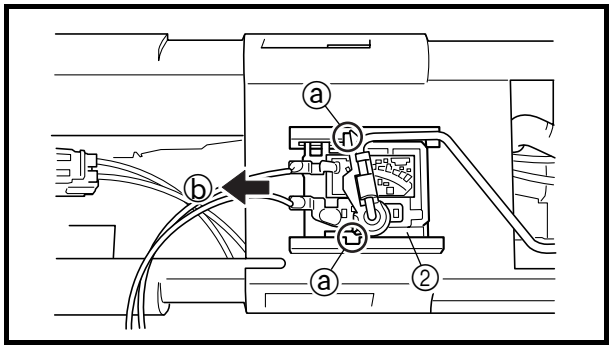
NOTE:
Remove the float ② at an angle to avoid catching it on the fuel tank.



Fuel sender disassembly

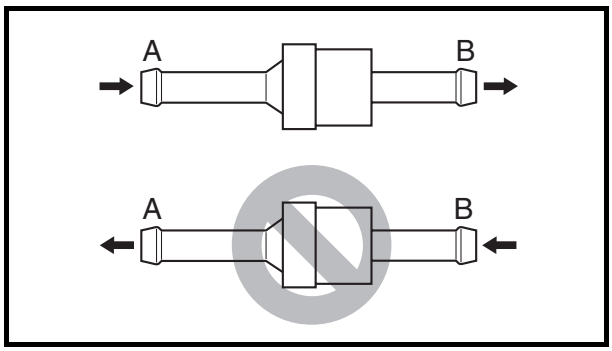
1. Disconnect:
   - Fuel sender coupler
2. Remove:
   - Retainer ①

NOTE:
Push the tabs in the direction of the arrows ⓐ, and then slide the retainer ① in the direction of arrow ⓑ.



3. Remove:
   - Fuel sender

NOTE:
Push the tabs ⓐ in, and then remove the fuel sender ② in the direction of the arrow ⓑ.

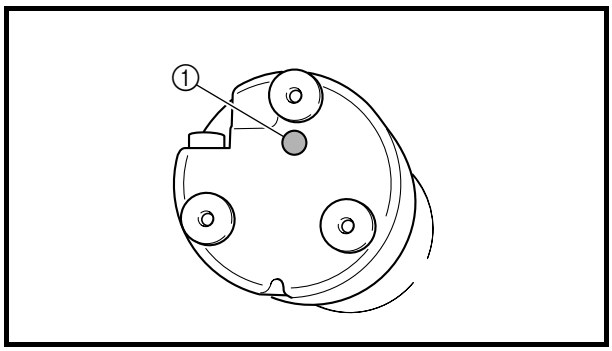


Check valve inspection

1. Check:
   - Check valve
     Faulty → Replace.

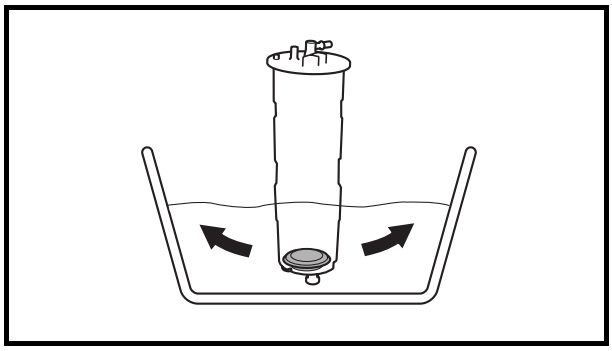
Checking steps:

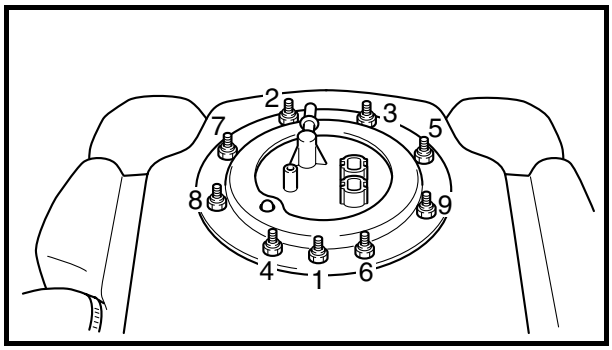
- Connect a hose to end "A" of the check valve, and then blow into the hose.
  Air should come out from end "B."
- Connect the hose to end "B" of the check valve, and then blow into the hose.
  Air should not come out from end "A."



Fuel pump filter inspection

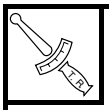
1. Check:
   - Fuel pump filter ①
     Clog/contaminants → Wash the fuel pump filter in kerosene or gasoline.





Fuel pump module installation

1. Tighten:
   - Nuts



Fuel pump module nut:
1st:
3.2 N • m
(0.32 kgf • m, 2.3 ft • lb)
2nd:
6.4 N • m
(0.64 kgf • m, 4.6 ft • lb)

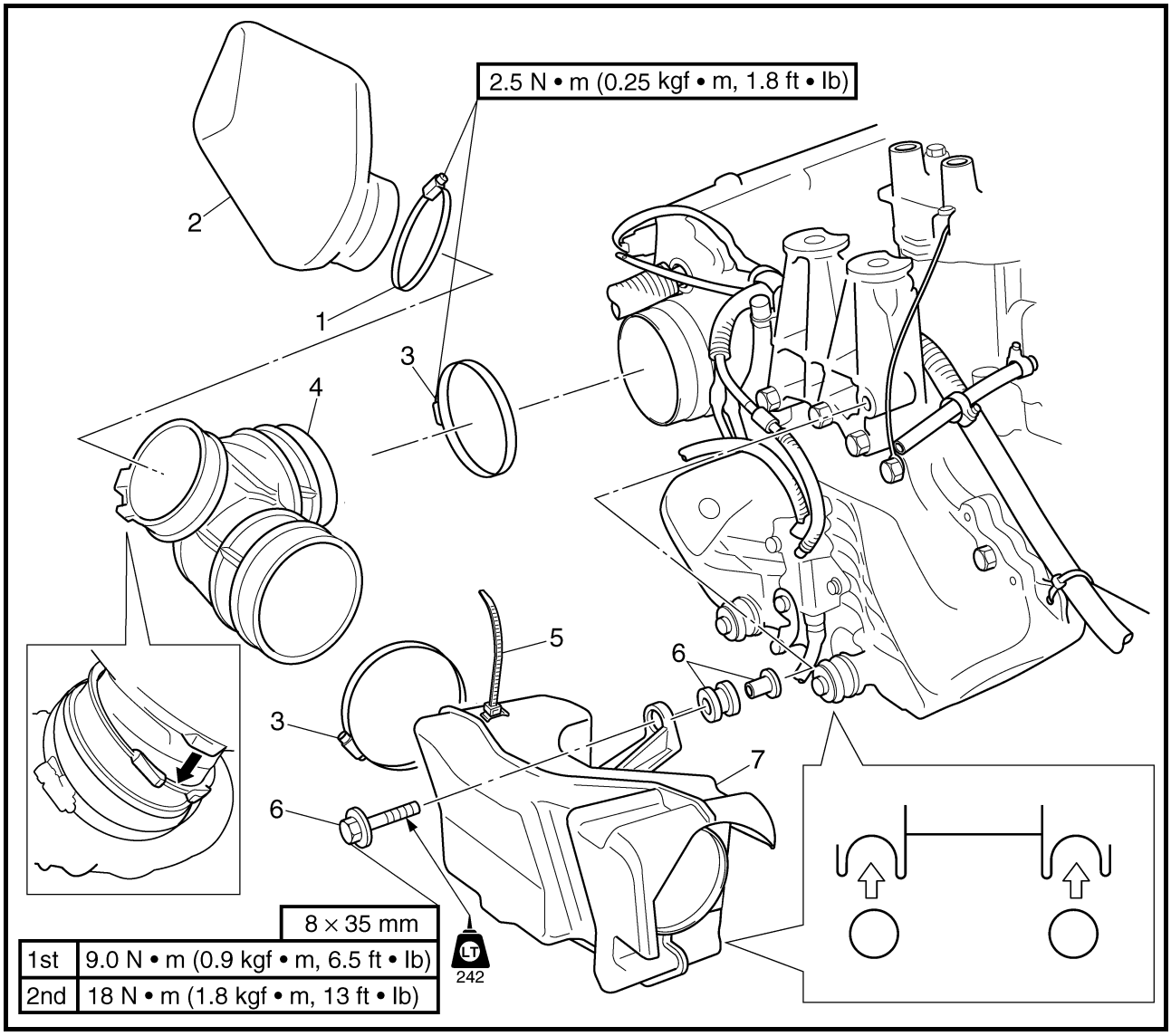
NOTE:
Tighten the nuts in the sequence shown and in two stages.

Fuel hose connection

Refer to "FUEL INJECTION SYSTEM."

INTAKE DUCT AND INTAKE SILENCER

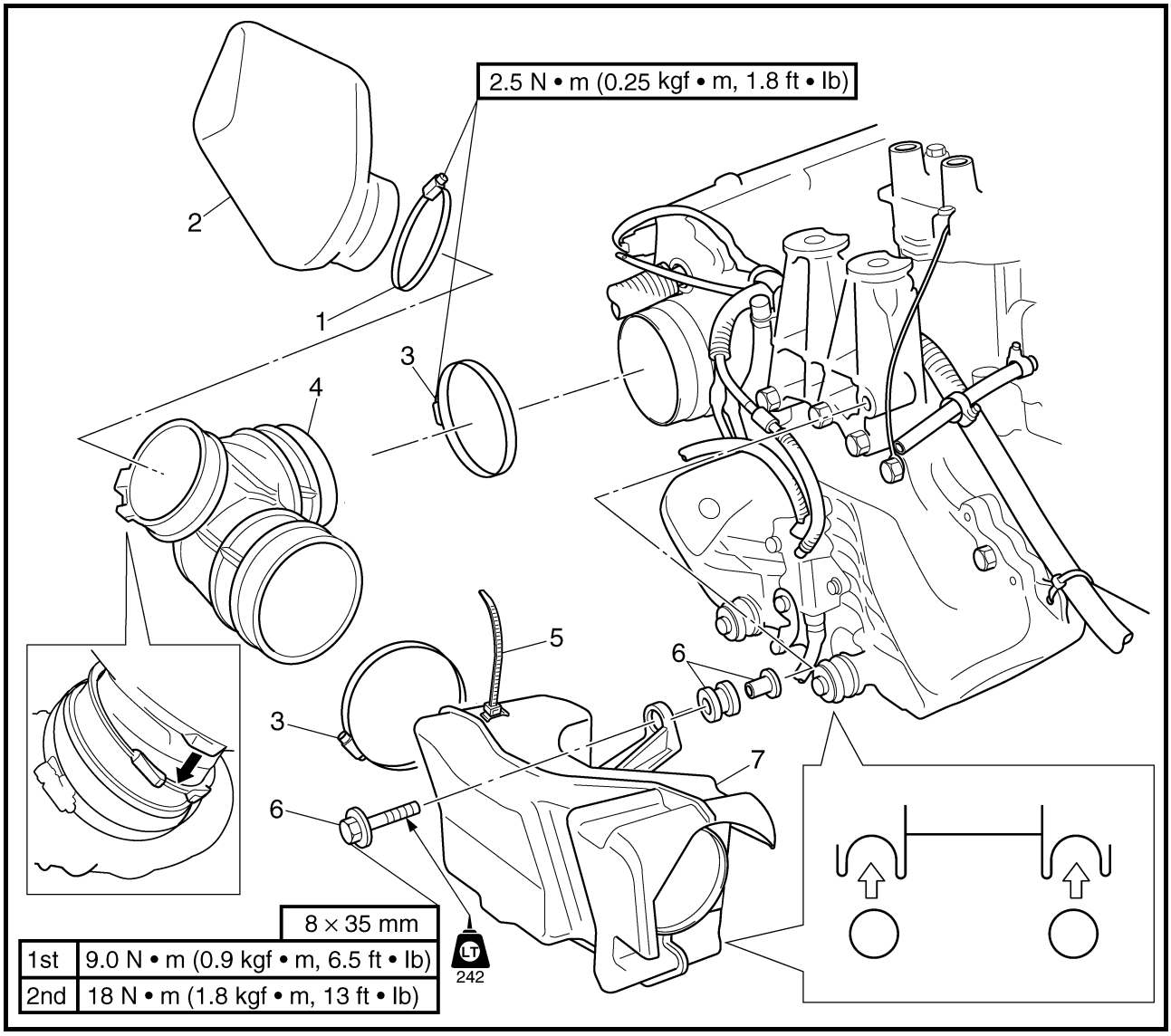
EXPLODED DIAGRAM



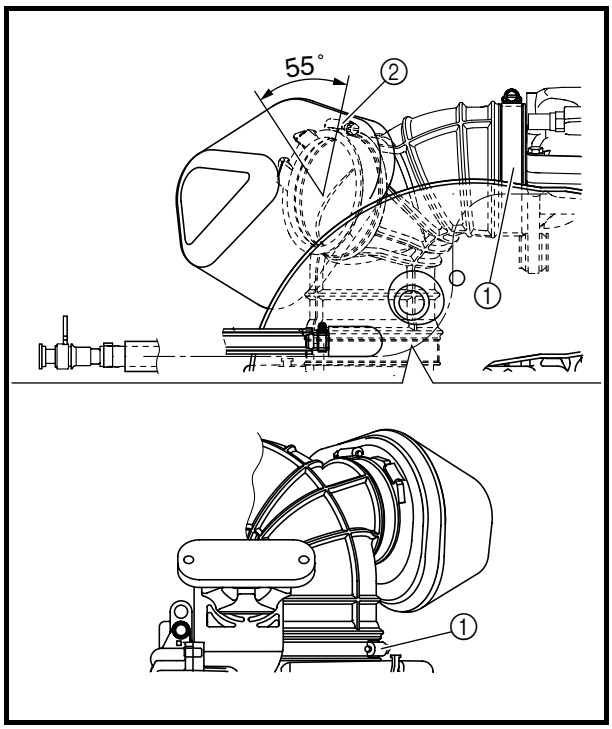
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	INTAKE DUCT AND INTAKE SILENCER REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY" in Chapter 5.
1	Intake silencer screw clamp	1	
2	Intake silencer	1	
3	Intake silencer pipe screw clamp	2	
4	Intake silencer pipe	1	
5	Plastic tie	1	**NOTE:** Fasten the fuel hose, oil return hose, and pilot water hose (port side) together with the plastic tie.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Bolt/collar/grommet	1/1/1	
7	Intake duct	1	
			Reverse the removal steps for installation.



SERVICE POINTS

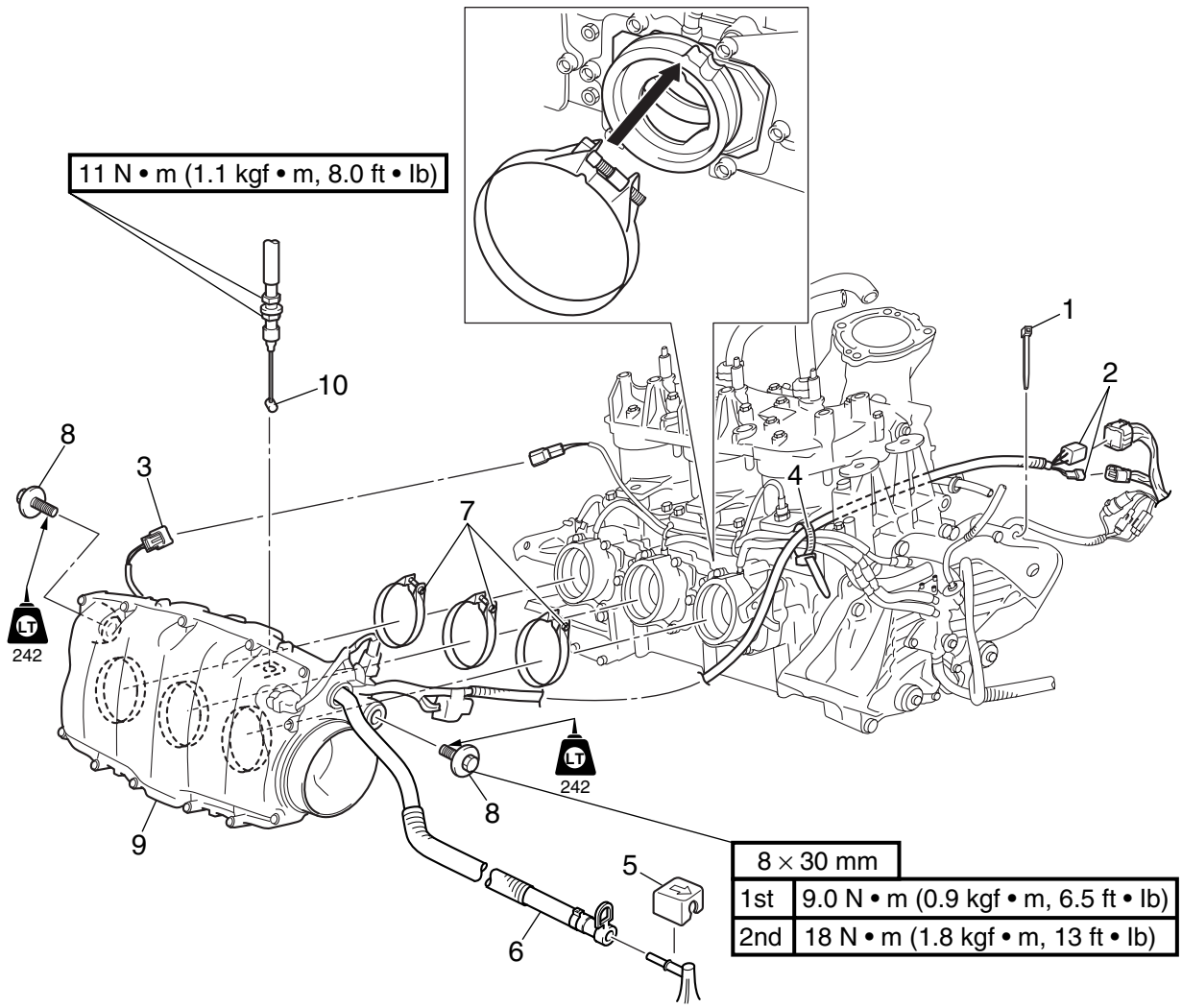
Intake silencer installation

1. Install:
   - Intake silencer pipe
   - Intake silencer pipe screw clamps ①
   - Intake silencer
   - Intake silencer screw clamp ②

NOTE:

Set the screw clamps in the direction shown.

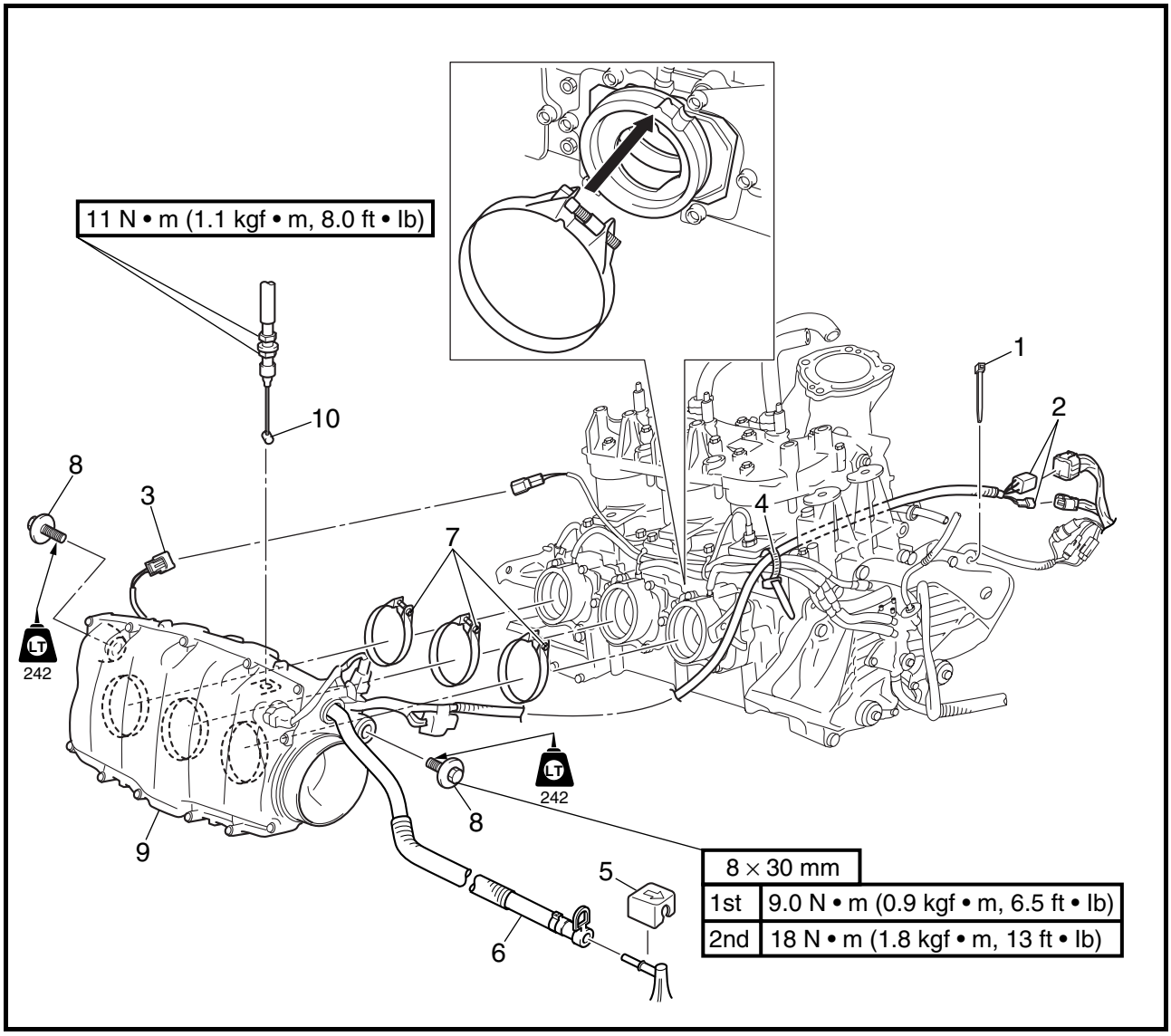
FUEL INJECTION SYSTEM
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

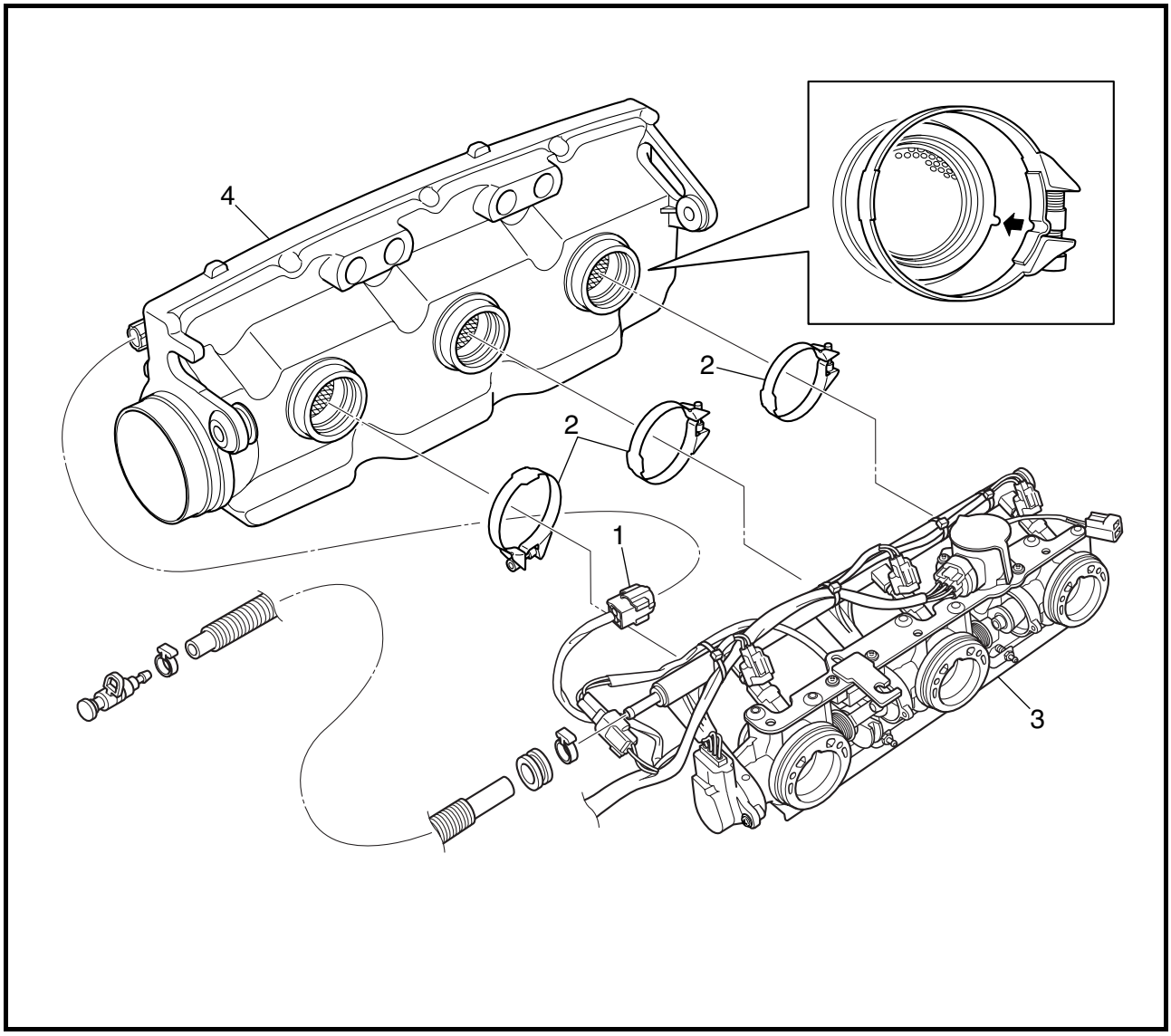
Step	Procedure/Part name	Q'ty	Service points
	THROTTLE BODIES ASSEMBLY REMOVAL		Follow the left "Step" for removal.
	Intake silencer pipe		Refer to "INTAKE DUCT AND INTAKE SILENCER."
1	Plastic tie	1	**NOTE:** Fasten the wire harness (lighting coil, pickup coil, ground lead) and sub-wire harness together with the plastic tie.
2	Sub-wire harness coupler/ throttle switch coupler	1/1	
3	Engine temperature sensor coupler	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
4	Plastic tie	1	**NOTE:** Fasten the sub-wire harness and oil delivery hoses together with the plastic tie.
5	Cover	1	
6	Fuel hose	1	
7	Throttle bodies screw clamp	3	Tighten the screw clamp until there is no clearance between the spacer and the screw clamp.
8	Bolt	2	
9	Throttle bodies assembly	1	
10	Throttle cable	1	Reverse the removal steps for installation.

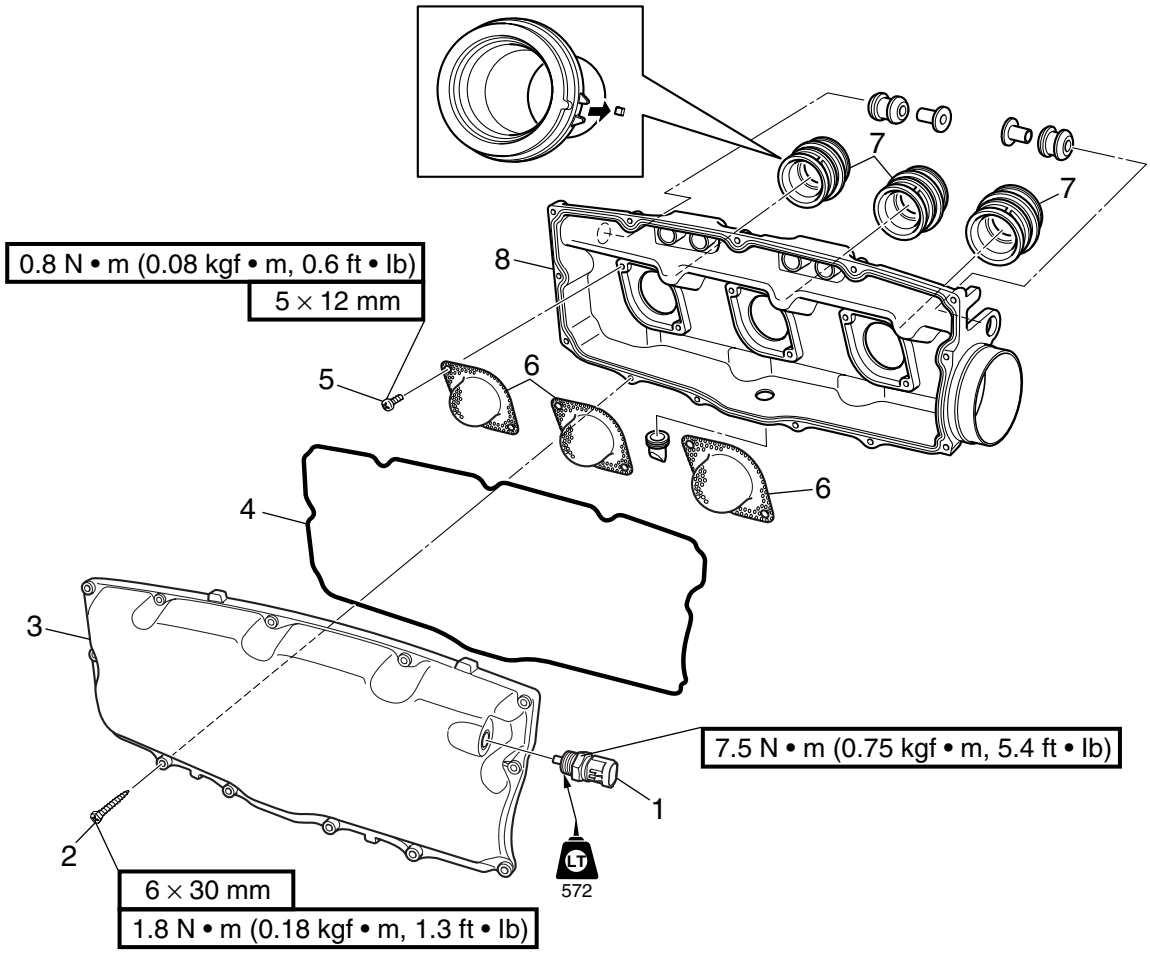
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	INTAKE SILENCER CASE AND THROTTLE BODIES REMOVAL		Follow the left "Step" for removal.
1	Intake air temperature sensor coupler	1	
2	Intake silencer case screw clamp	3	Tighten the screw clamp until there is no clearance between the spacer and the screw clamp.
3	Throttle bodies	1	
4	Intake silencer case	1	
			Reverse the removal steps for installation.

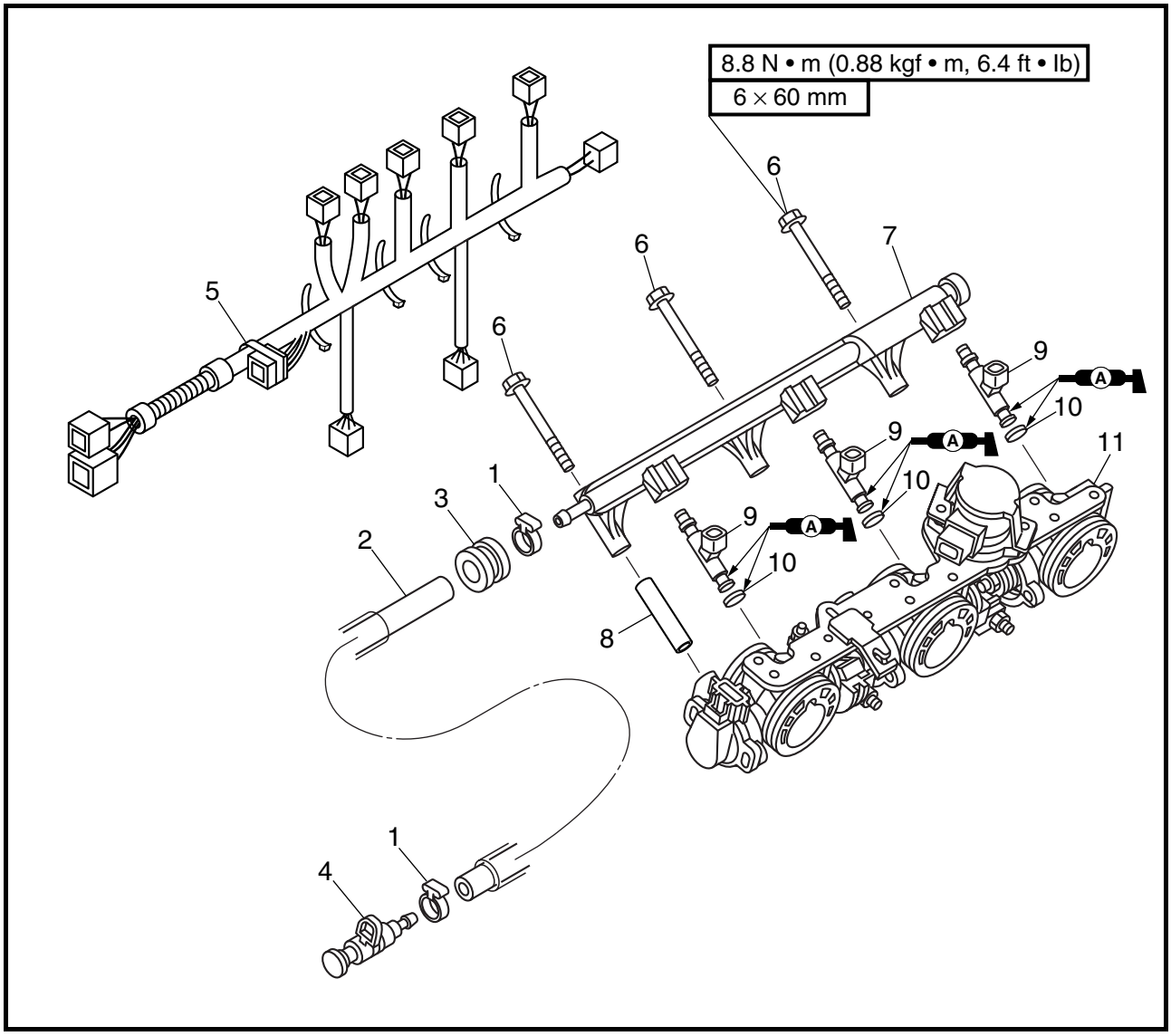
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	INTAKE SILENCER CASE DISASSEMBLY		Follow the left "Step" for disassembly.
1	Intake air temperature sensor	1	
2	Tapping screw	13	
3	Intake silencer case cover	1	
4	Gasket	1	
5	Screw	6	
6	Flame arrester	3	
7	Intake silencer case joint	3	
8	Intake silencer case	1	
			Reverse the disassembly steps for assembly.

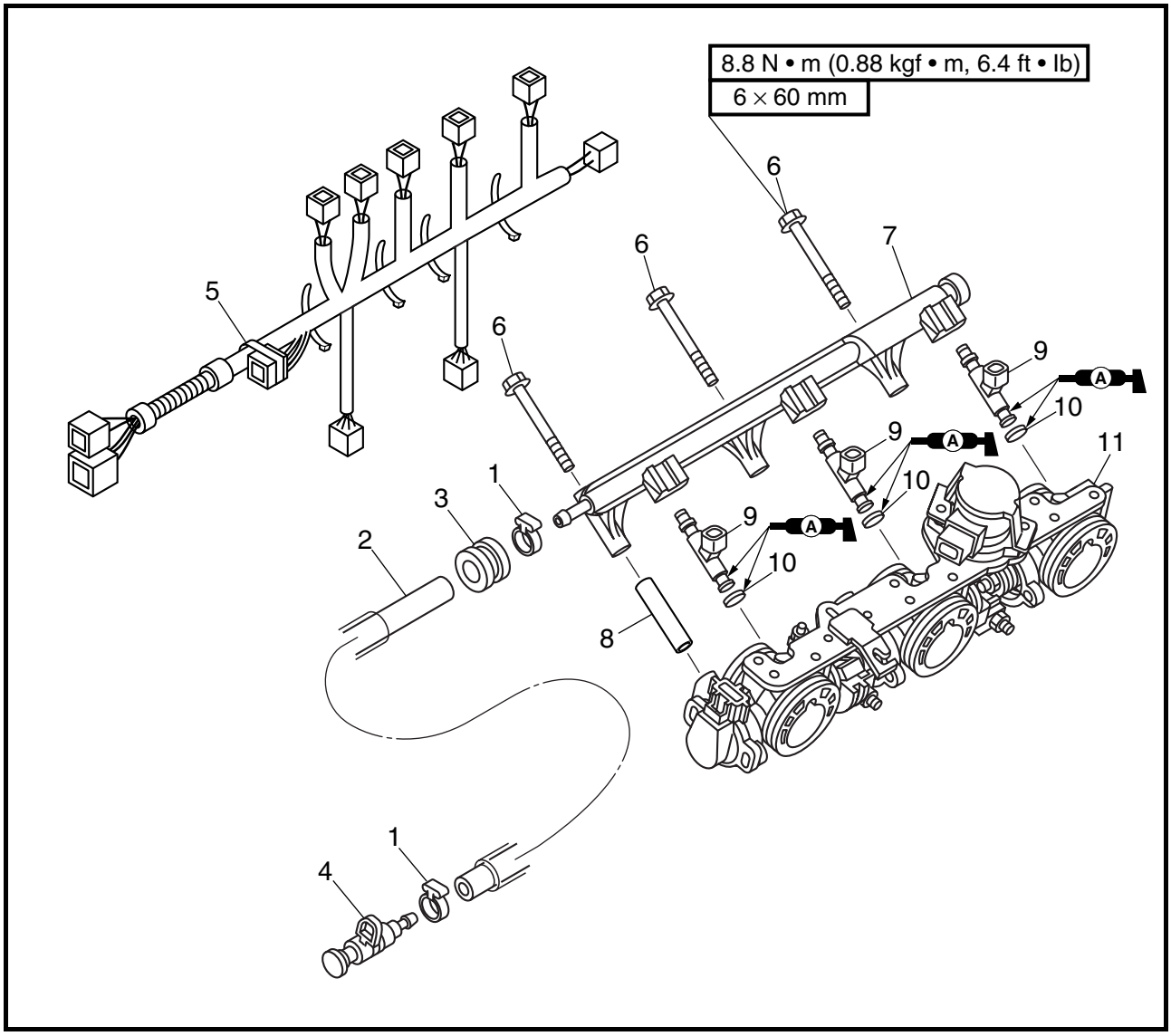
EXPLODED DIAGRAM



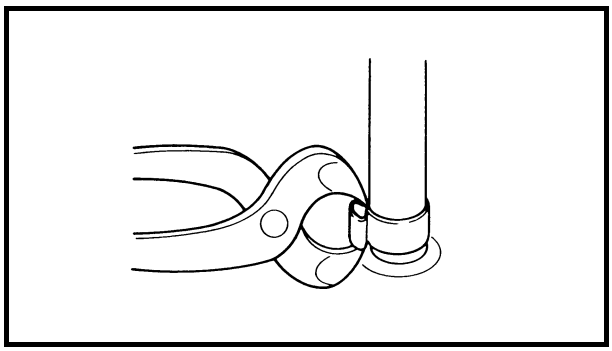
REMOVAL AND INSTALLATION CHART

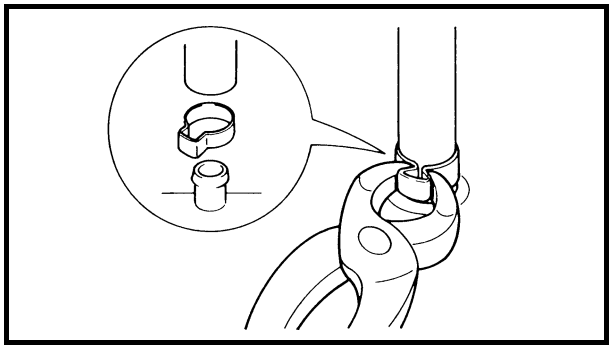
Step	Procedure/Part name	Q'ty	Service points
	THROTTLE BODIES DISASSEMBLY		Follow the left "Step" for disassembly.
1	Hose clamp	2	**Not reusable**
2	Fuel hose	1	
3	Grommet	1	
4	Quick connector	1	
5	Sub-wire harness	1	
6	Bolt	3	
7	Fuel rail	1	
8	Spacer	3	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Fuel injector	3	
10	O-ring	3	**Not reusable**
11	Throttle bodies	1	
			Reverse the disassembly steps for assembly.





SERVICE POINTS

Hose clamp removal

1. Remove:
   - Hose clamps

CAUTION:

If the hose clamps are removed without cutting the crimp first, the fuel hose can be damaged.

Hose clamp installation

1. Install:
   - Hose clamps

⚠ WARNING

Do not reuse the hose clamps, always replace them with new ones.

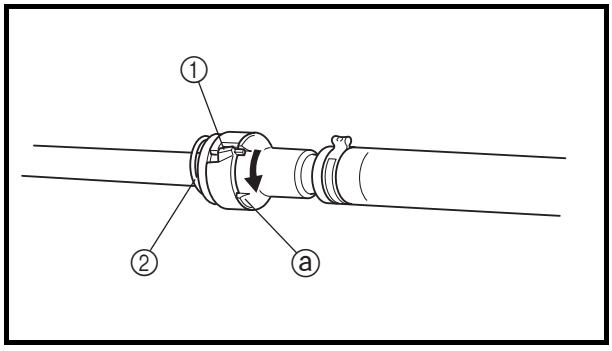
NOTE:

Crimp the hose clamps properly to securely fasten them.

Fuel hose disconnection

⚠ WARNING

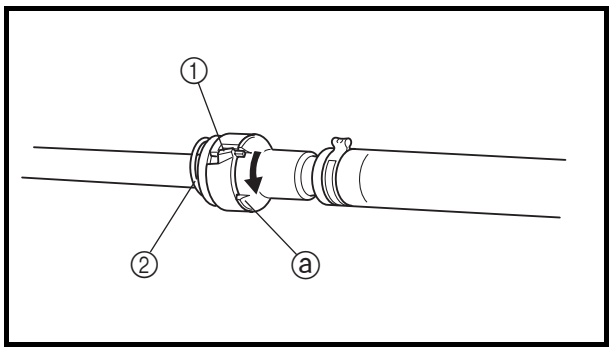
Before disconnecting the fuel hoses, remove the fuel tank filler cap to reduce any pressure inside the fuel tank, and then disconnect the negative battery lead to cut off the electric current to the electrical systems.



1. Wrap the quick connector with a cloth, and then rotate the quick connector tab ① to the stopper position ⓐ.

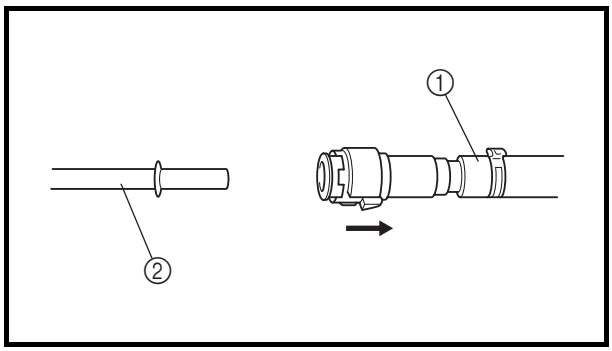
⚠ WARNING

If the quick connector is removed suddenly, pressurized fuel can spray out. To gradually release the fuel pressure, be sure to remove the quick connector slowly.



CAUTION:

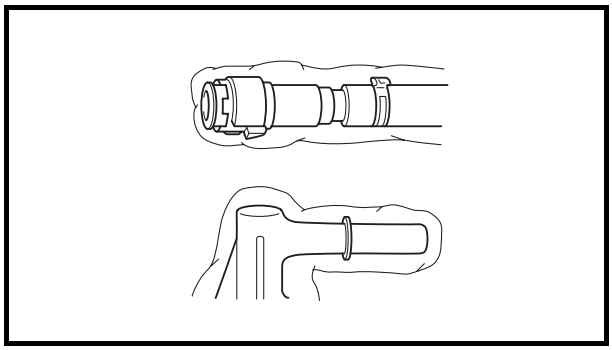
- **Do not rotate the quick connector tab ① past the stopper position ⓐ, otherwise the tab can be damaged.**
- **When the fuel hoses are disconnected, quickly remove the retainer ② from the quick connector, otherwise the retainer can be lost.**



2. Disconnect the fuel hose ① from the fuel pipe ② directly.

⚠ WARNING

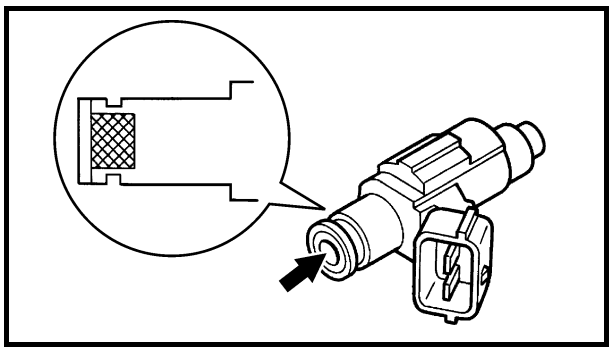
Always reduce the fuel pressure in the fuel line before servicing the line or the fuel pipe. If the fuel pressure is not released, pressurized fuel can spray out.

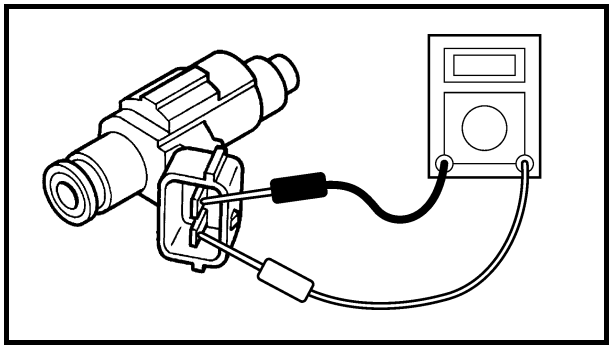


3. Cover the quick connector and fuel pipe with a plastic bag to prevent damage and to protect them from dirt.

Fuel line inspection

1. Check:
   - Fuel hose
     Damage/cracks → Replace.
   - O-rings (quick connector)
     Damage/cracks → Replace the quick connector.
   - Fuel pipe
     Damage/cracks → Replace the fuel pump.





Fuel injector inspection

CAUTION:

The throttle bodies should not be disassembled unnecessarily.

1. Check:
   - Fuel injector
     Dirt/residue → Clean.
     Damage → Replace.
2. Measure:
   - Fuel injector resistance
     Out of specification → Replace.

Digital multimeter:
YU-34899-A
Digital circuit tester:
90890-03174

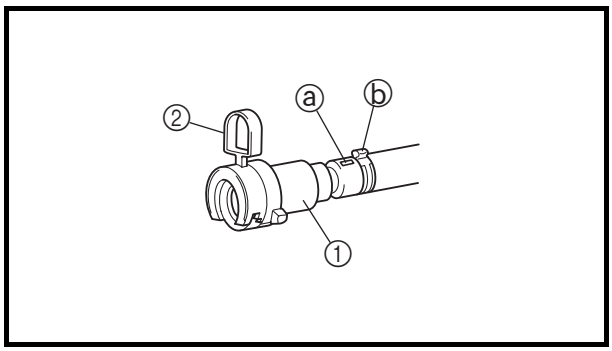
Fuel injector resistance (reference data):
13.8 Ω at 21 °C (70 °F)

3. Check the operation of the fuel injector using the “Stationary Test” of the Yamaha Diagnostic System.

Throttle body inspection

1. Check:
   - Throttle body
     Cracks/damage → Replace the throttle bodies.
2. Check:
   - Fuel passages
     Obstruction → Clean.

Checking steps:
- Wash the throttle body in a petroleum based solvent.
  Do not use any caustic carburetor cleaning solution.
- Blow out all of passages with compressed air.

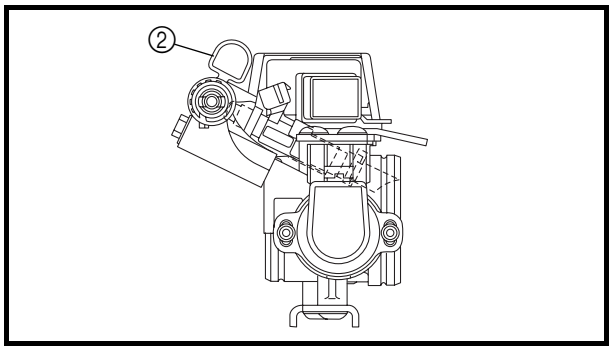


Fuel hose installation (replacing with new fuel hose)

1. Install:
   - Quick connector ①

NOTE:

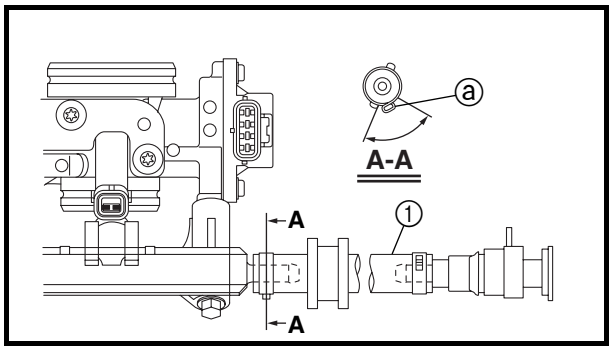
To install the fuel hose, be sure to align the lot mark ⓐ on the fuel hose and the checker tab ② on the quick connector with the crimped section ⓑ of the clamp.

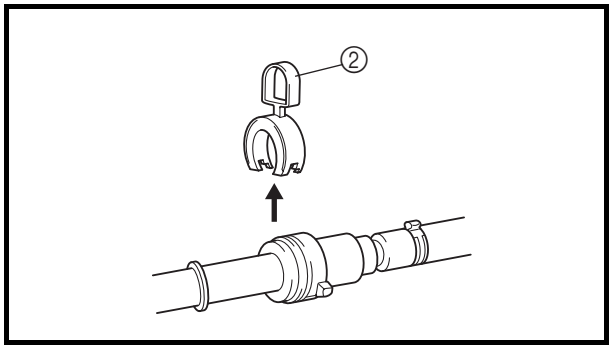


2. Install:
   - Fuel hose ①

NOTE:

- Install the checker tab ② of the fuel hose in the position shown in the illustration in relation to the throttle bodies.
- Install the clamp with the crimped section at the angle shown in the illustration.
- When replacing the fuel hose with a new one, a checker tab ② that has half engagement prevention is attached to the quick connector of the hose. If the quick connector is completely installed to the fuel pipe, it is removable.





Fuel hose connection

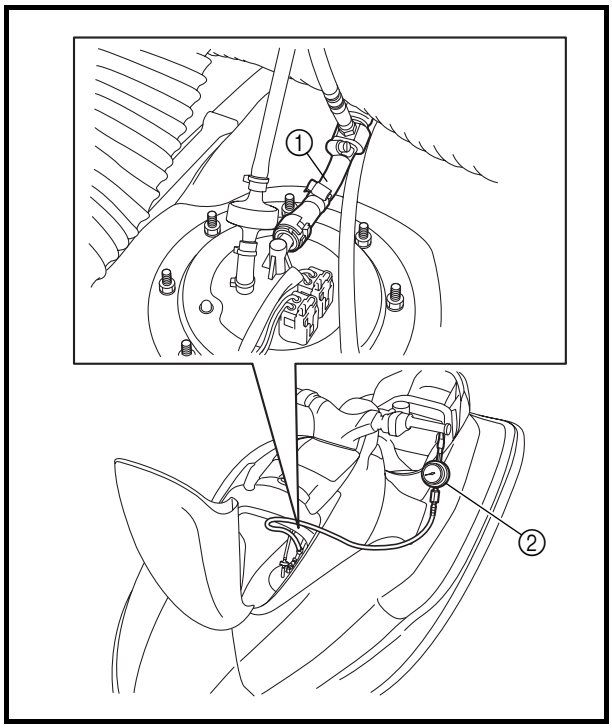
1. Apply a thin coat of engine oil to the contact surfaces of the fuel pipe.
2. Insert the quick connector into the fuel pipe until you hear a “click.”
3. To check the connection of the quick connector, push and pull on the quick connector several times until there is free play of 2–3 mm (0.08–0.12 in).

NOTE:

If free play cannot be obtained, disconnect the fuel hose and check the O-ring for damage and that it is properly installed.

Throttle cable installation

1. Adjust:
   - Oil pump lever position
     Refer to “OIL PUMP.”
2. Adjust:
   - Throttle lever free play
     Refer to “CONTROL SYSTEM” in Chapter 3.



Fuel pressure measurement

1. Disconnect:
   - Fuel hose
     Refer to “Fuel hose disconnection.”
2. Install:
   - Fuel pressure gauge adapter ①
   - Fuel pressure gauge ②

Fuel pressure gauge adapter:
YW-06842/90890-06842
Fuel pressure gauge:
YB-06766/90890-06786

NOTE:

To connect the fuel pressure gauge adapter, follow the procedures for connecting a fuel hose. (Refer to “Fuel hose connection.”)

3. Start the engine and warm it up for several minutes.
4. Measure:
   - Fuel pressure
     Out of specification → Replace the fuel pump module.

Fuel pressure:
320.8–327.2 kPa
(3.21–3.27 kgf/cm^2,
45.62–46.53 psi)

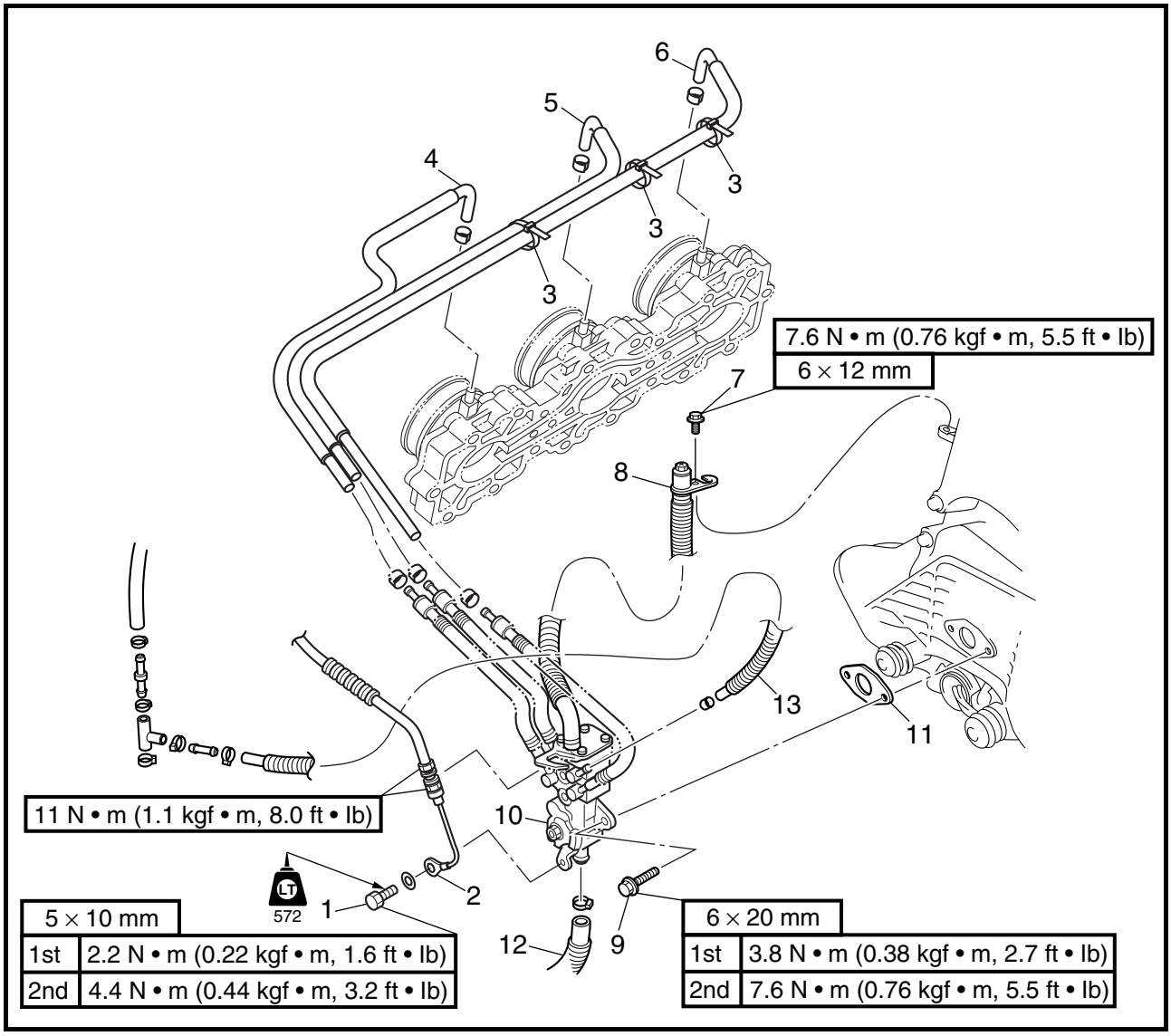
5. Remove:
   - Fuel pressure gauge
   - Fuel pressure gauge adapter

NOTE:
To disconnect the fuel pressure gauge adapter, follow the procedures for disconnecting a fuel hose. (Refer to "Fuel hose disconnection.")

6. Connect:
   - Fuel hose
     Refer to "Fuel hose connection."

OIL PUMP

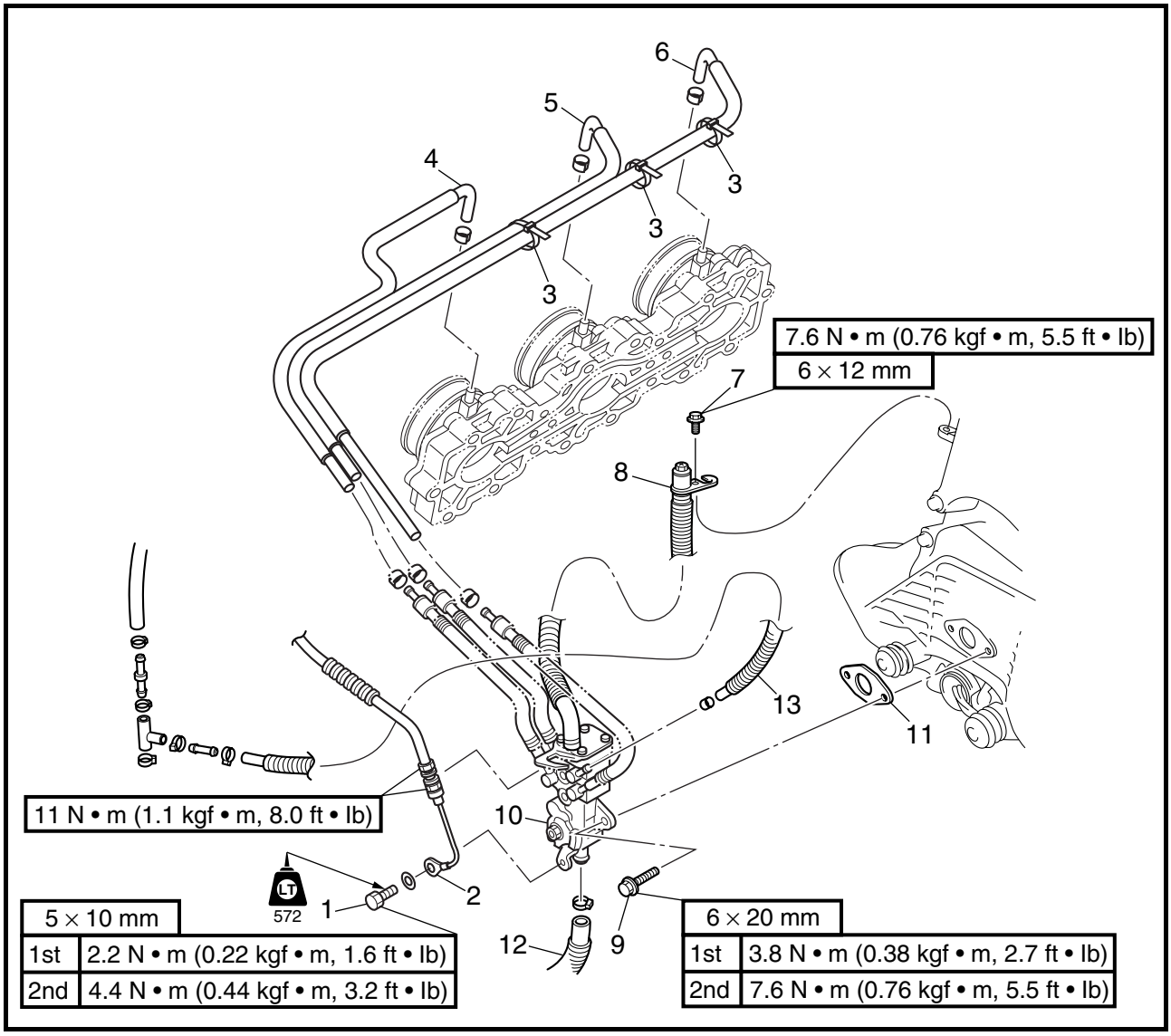
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

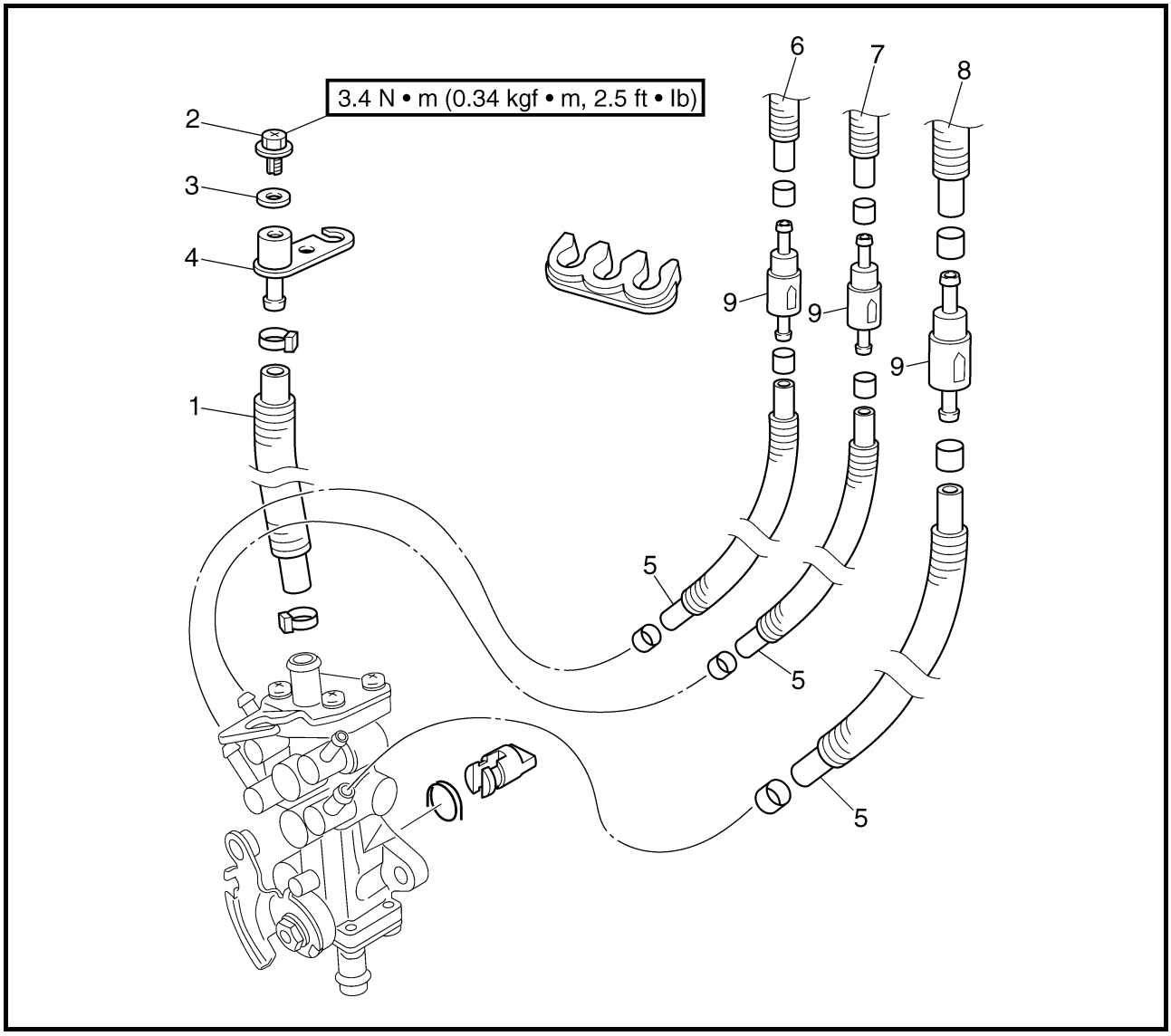
Step	Procedure/Part name	Q'ty	Service points
	OIL PUMP REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY" in Chapter 5.
	Intake duct		Refer to "INTAKE DUCT AND INTAKE SILENCER."
1	Bolt	1	
2	Oil pump cable	1	Route the oil pump cable outside of the bleed hose and the oil delivery hoses.
3	Plastic tie	3	**Not reusable**
4	Oil delivery hose #1	1	
5	Oil delivery hose #2	1	
6	Oil delivery hose #3	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Bolt	1	
8	Bleed hose stay	1	
9	Bolt	2	
10	Oil pump assembly	1	
11	Gasket	1	**Not reusable**
12	Oil suction hose	1	
13	Oil return hose	1	
			Reverse the removal steps for installation.

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	OIL PUMP HOSES AND CABLE REMOVAL		Follow the left "Step" for removal.
1	Bleed hose	1	
2	Air bleed screw	1	
3	Gasket	1	
4	Bleed hose stay	1	
5	Oil delivery hose	3	
6	Oil delivery hose #1	1	
7	Oil delivery hose #2	1	
8	Oil delivery hose #3	1	
9	Check valve	3	
			Reverse the removal steps for installation.

SERVICE POINTS

Oil pump inspection

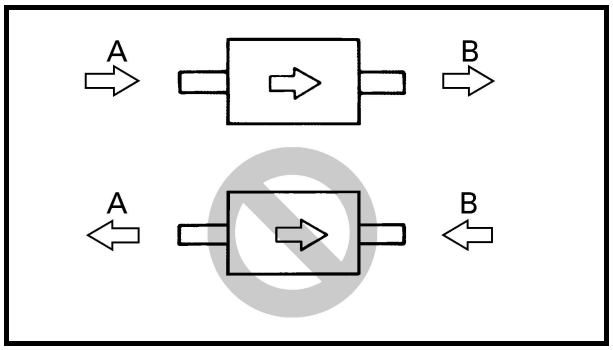
1. Check:
   - Oil pump
     Contaminants → Clean.
     Damage/wear → Replace.
   - Oil pump joint piece
     Damage/wear → Replace the oil pump.

Oil hose inspection

1. Check:
   - Oil hoses
     Cracks/damage → Replace.

CAUTION:

- **If the oil delivery hoses and the oil suction hose are not full of oil, fill them up.**
- **Bleed the oil pump, delivery hoses, and oil suction hose after installing them.**

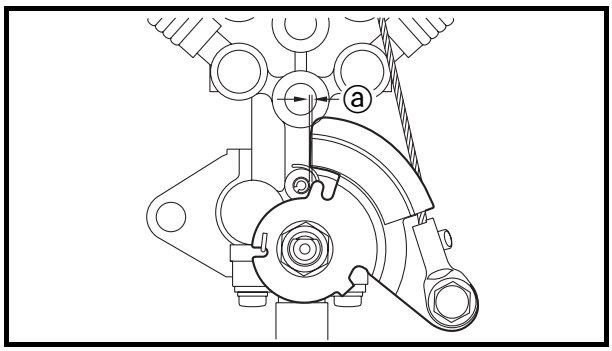


Check valve inspection

1. Check:
   - Check valve
     Faulty → Replace.

Checking steps:

- Connect a hose to end “A” of the check valve, and then blow into the hose.
  Air should come out from end “B.”
- Connect the hose to end “B” of the check valve, and then blow into the hose.
  Air should not come out from end “A.”

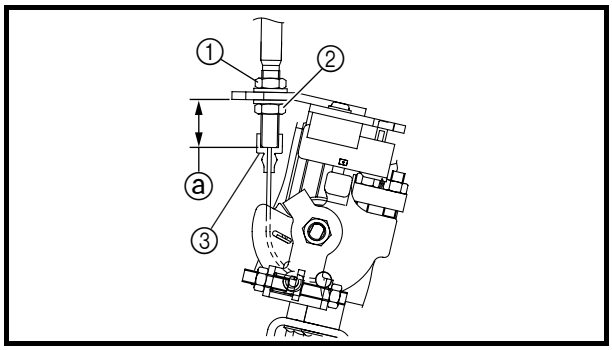


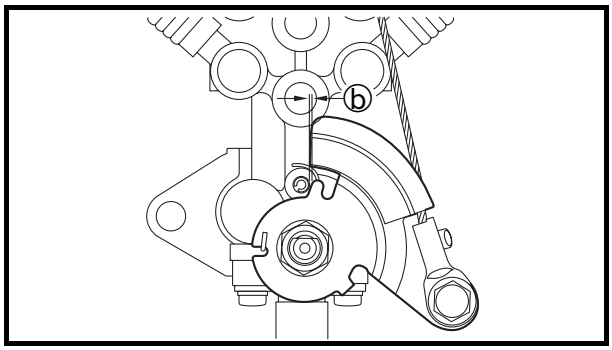
Oil pump lever position adjustment

1. Check:
   - Oil pump lever position
     Incorrect → Adjust.

Checking steps:

- Remove the intake duct.
  Refer to "INTAKE DUCT AND INTAKE SILENCER."
- Squeeze the throttle lever to fully open the throttle valve lever.
- Check that the gap of the oil pump lever is 0–0.5 mm (0–0.0197 in) ⓐ.
- Install the intake duct.
  Refer to "INTAKE DUCT AND INTAKE SILENCER."





2. Adjust:
   - Oil pump lever position

Adjustment steps:

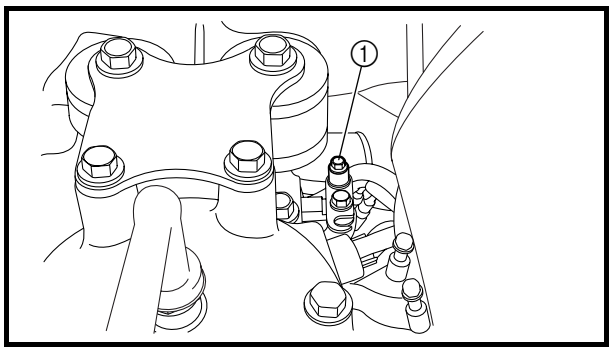
- Remove the intake duct.
  Refer to "INTAKE DUCT AND INTAKE SILENCER."
- Loosen the locknut ① and adjusting nut ② of the throttle cable.
- Adjust the throttle cable length to 18.5 ± 1.0 mm (0.728 ± 0.039 in) ⓐ.
- Tighten the locknut and adjusting nut.

CAUTION:

Check that the cover ③ is securely installed.

Locknut and adjusting nut:
11 N • m (1.1 kgf • m, 8.0 ft • lb)

- Check that there is free play between the throttle cable and throttle valve lever.
- Squeeze the throttle lever to fully open the throttle valve lever.
- Check that the gap of the oil pump lever is 0–0.5 mm (0–0.0197 in) ⓑ.
- Install the intake duct.
  Refer to "INTAKE DUCT AND INTAKE SILENCER."



Oil pump bleeding

1. Bleed:
   - Oil pump

Bleeding steps:

- Place rags around the air bleed screw ① to catch any oil that might spill.
- Fill the oil tank with the recommended oil.

NOTE:

If the oil pump is replaced or when the oil suction hose and oil delivery hoses are disconnected from the oil pump, fill the hoses with oil, and then connect them to the oil pump.

After connecting the oil suction hose, be sure to it fasten it with a locking tie.

Recommended engine oil:
YAMALUBE 2-W oil only

- Loosen the air bleed screw ① two full turns and check that both the oil and air bubbles flow out.
- When there are no air bubbles remaining, tighten the air bleed screw.
- Wipe up any spilt oil.

Air bleed screw:
3.4 N • m (0.34 kgf • m, 2.5 ft • lb)

CAUTION:

- **Do not run the engine if oil does not flow out of the air bleed screw. Check the oil pump hoses for proper routing and make sure that there are no restrictions in the line.**
- **Use only YAMALUBE 2-W oil. Using another oil can seriously damage the catalytic converter or other engine components.**

CHAPTER 5
POWER UNIT

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COMPRESSION PRESSURE MEASUREMENT

SERVICE POINTS

The following procedure applies to all of the cylinders.

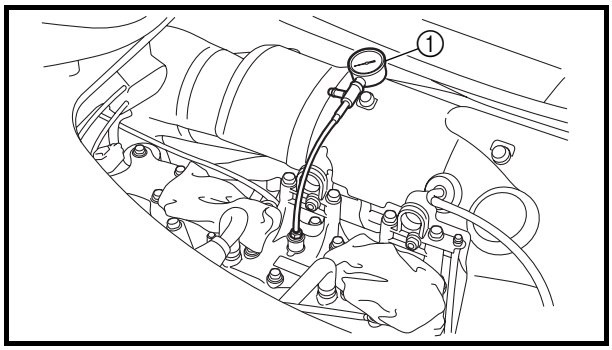
NOTE:

Insufficient compression pressure will result in a loss of performance.

1. Start the engine and warm it up until the engine temperature is 48 °C (118 °F).
2. Remove:
   - Seat
3. Disconnect:
   - Spark plug caps
4. Remove:
   - Spark plugs

CAUTION:

Before removing the spark plugs, blow compressed air into the spark plug wells to clear out any dirt or dust that can fall into the cylinders.



5. Install:
   - Compression gauge ①

Compression gauge:
YU-33223-1/90890-03160

6. Measure:
   - Compression pressure
     Out of specification → Refer to steps (b) and (c).

Minimum compression pressure (reference data):
640 kPa (6.4 kgf/cm², 91 psi)

Measurement steps:

a. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

⚠ WARNING

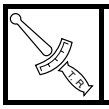
To prevent sparking, ground all spark plug leads before cranking the engine.

b. If the compression pressure is extremely high, check the cylinder head and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
c. If the compression pressure is below specification and the compression pressure for each cylinder is unbalanced, squirt a few drops of oil into the cylinder and measure the compression pressure again.

Refer to the following table.

Compression pressure (with oil applied to the cylinder)	
Reading	**Diagnosis**
Higher than without oil	**Piston ring wear, piston wear or damage → Replace.**
Same as without oil	**Cylinder head gasket or piston possibly defective → Replace.**

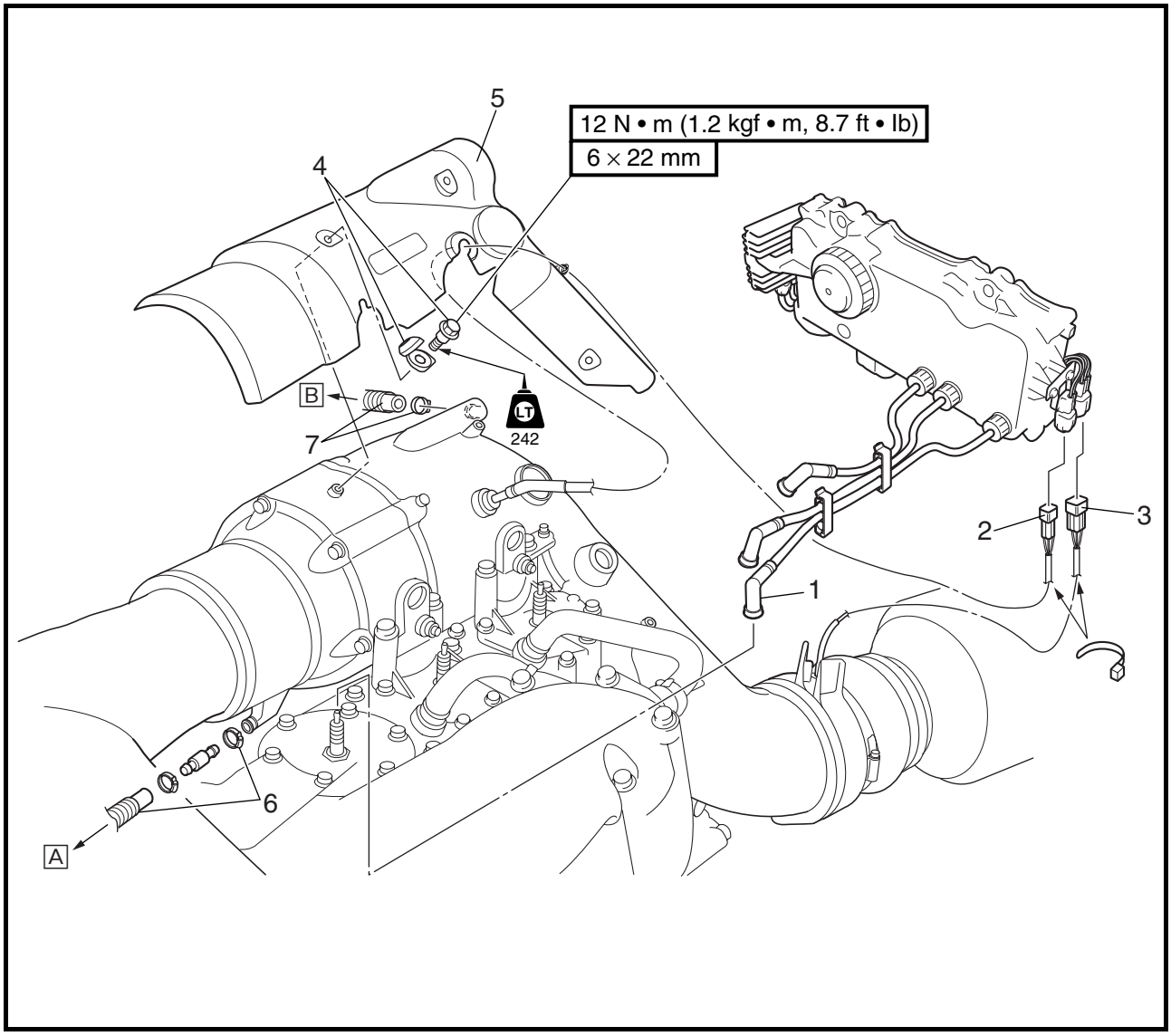
7. Install:
   - Spark plugs



Spark plug:
25 N • m (2.5 kgf • m, 18 ft • lb)

MUFFLER ASSEMBLY

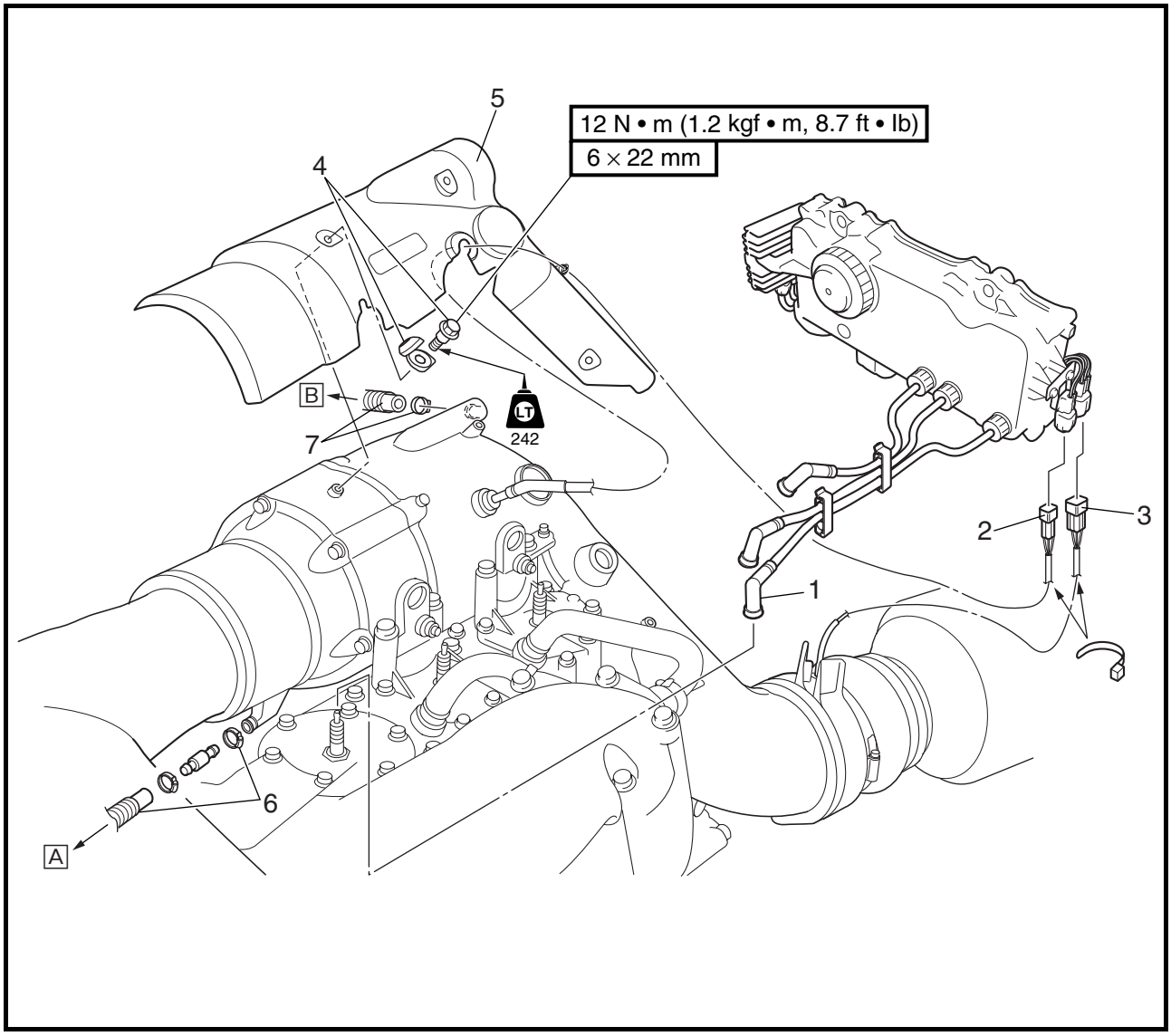
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

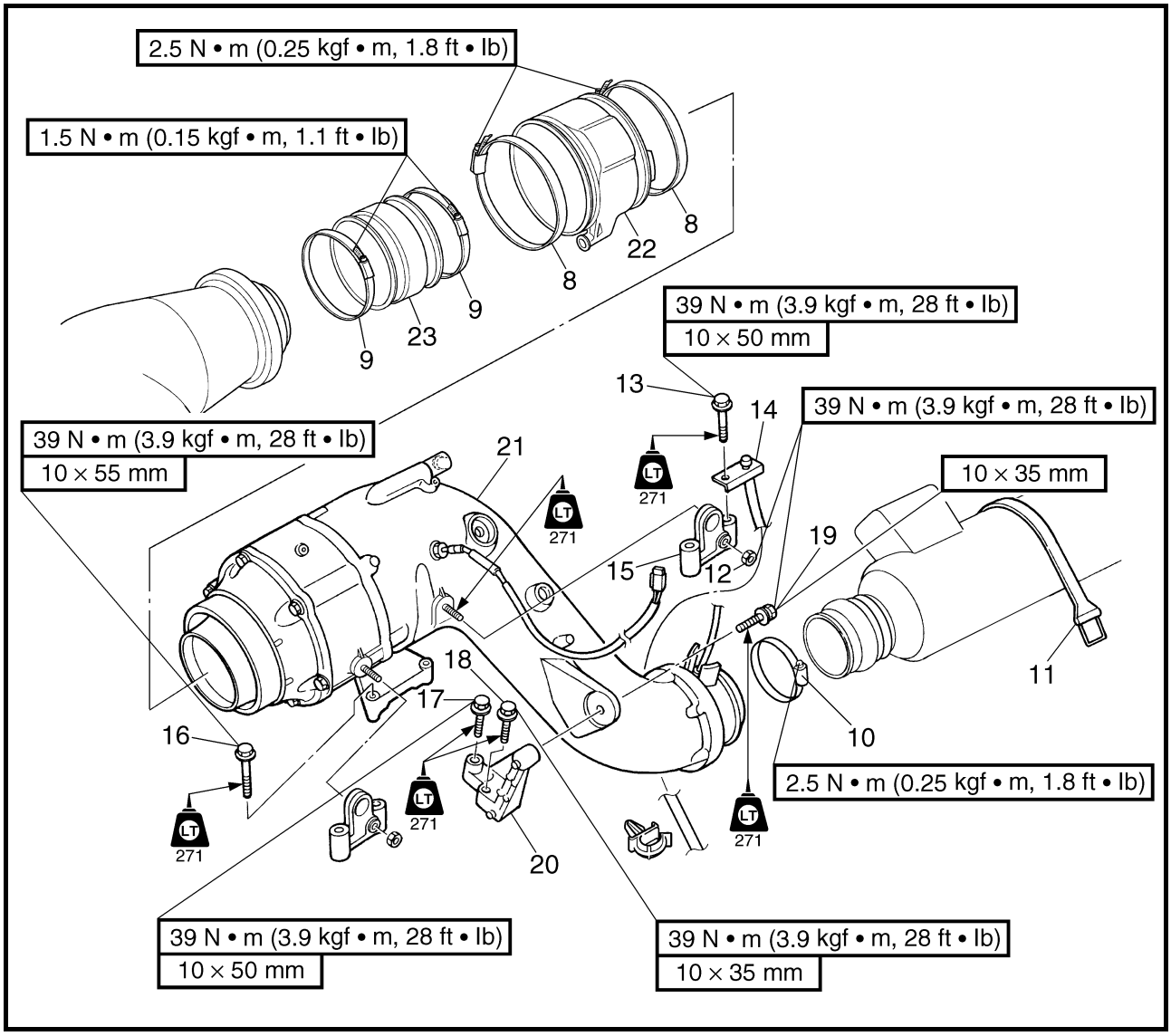
Step	Procedure/Part name	Q'ty	Service points
	MUFFLER REMOVAL		Follow the left "Step" for removal.
	YPVS servomotor and YPVS servomotor bracket		Refer to "YPVS SERVOMOTOR" in Chapter 7.
	Battery box		Refer to "BATTERY BOX" in Chapter 8.
1	Spark plug cap	3	
2	Exhaust temperature sensor coupler	1	
3	Cooling water temperature sensor coupler	1	
4	Cap/bolt	3/3	
5	Cover	1	

EXPLODED DIAGRAM



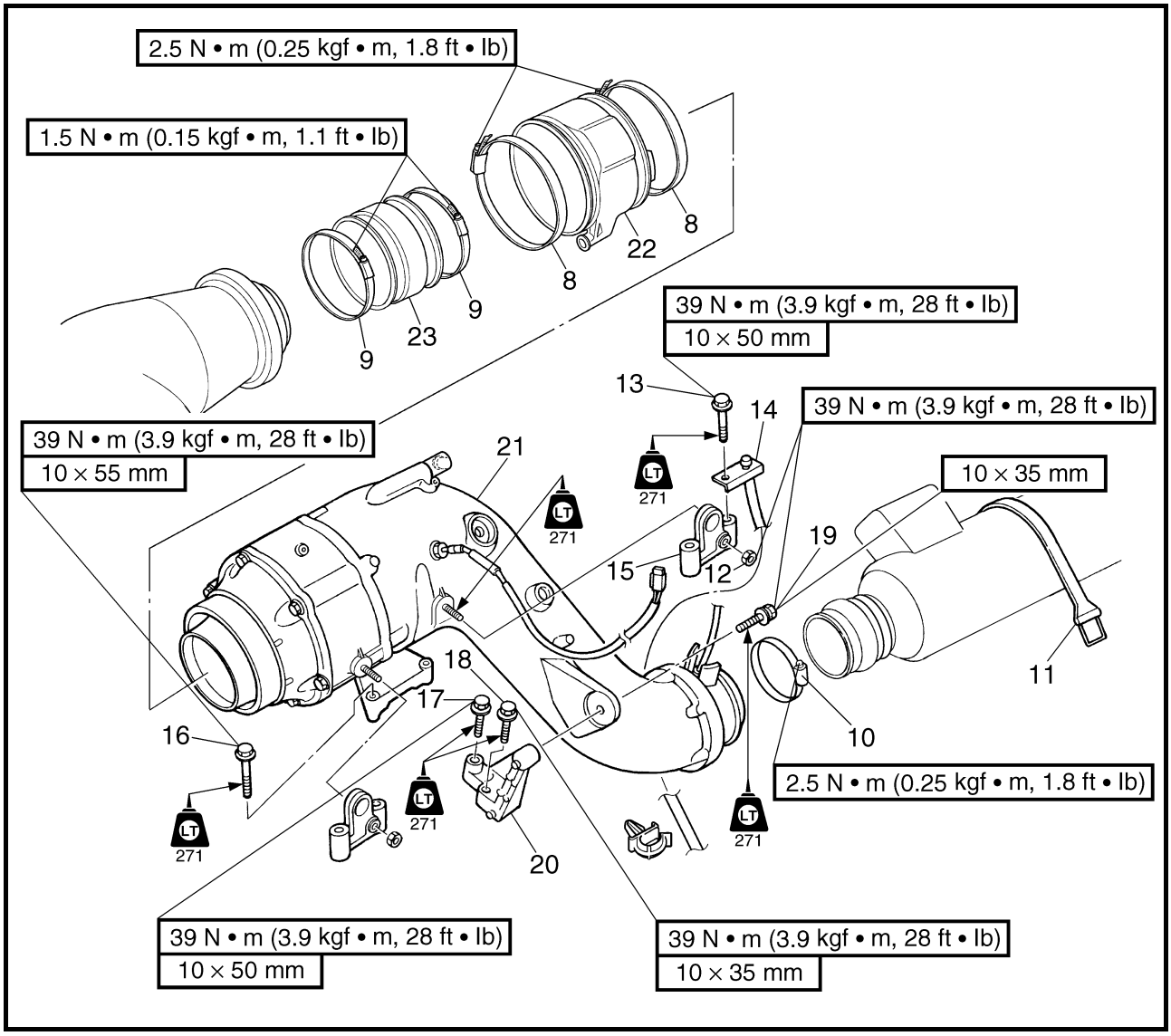
Step	Procedure/Part name	Q'ty	Service points
6	Screw clamp/cooling water hose	1/1	A To cooling water pilot outlet (port) Route the cooling hose under the exhaust chamber assembly.
7	Screw clamp/cooling water hose	1/1	B To cooling water outlet (stern) Contact the corrugated tube to the hose screw clamp (muffler assembly end).

EXPLODED DIAGRAM



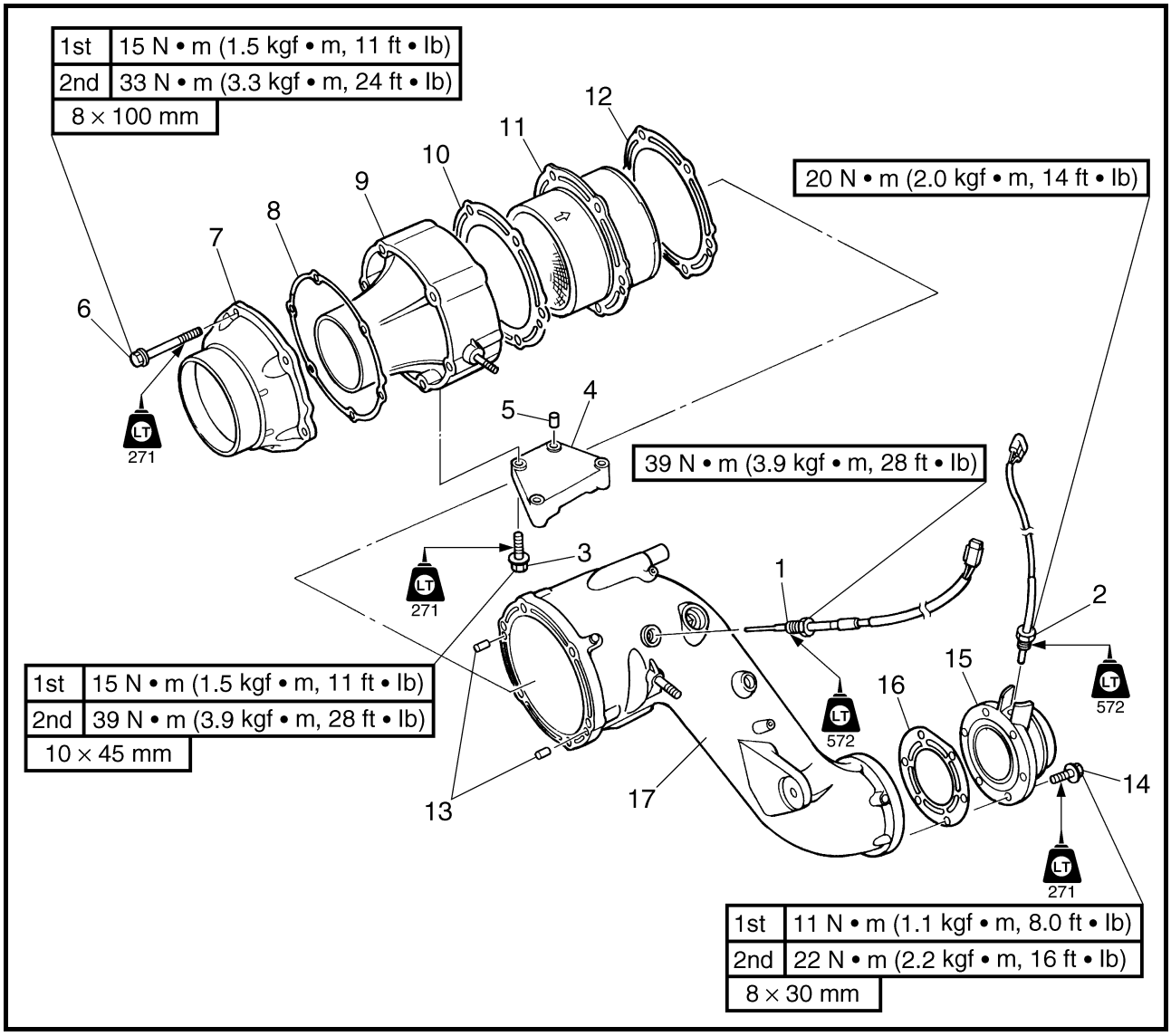
Step	Procedure/Part name	Q'ty	Service points
8	Outer exhaust joint screw clamp	2	Slide the outer exhaust joint off.
9	Inner exhaust joint screw clamp	2	
10	Exhaust joint screw clamp	1	
11	Water lock band	1	Slide the water lock off.
12	Nut	2	
13	Bolt	4	
14	Intermediate housing grease hose	1	
15	Eye	2	**NOTE:** To ease removal of the muffler assembly, remove the spark plugs before removing the eye, remove the muffler, and then reinstall the spark plugs.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
16	Bolt	2	
17	Bolt	1	
18	Bolt	1	
19	Bolt	1	
20	Muffler stay 2	1	
21	Muffler assembly	1	**NOTE:** Remove the cylinder head if it is difficult to remove the muffler assembly.
22	Outer exhaust joint	1	
23	Inner exhaust joint	1	
			Reverse the removal steps for installation.

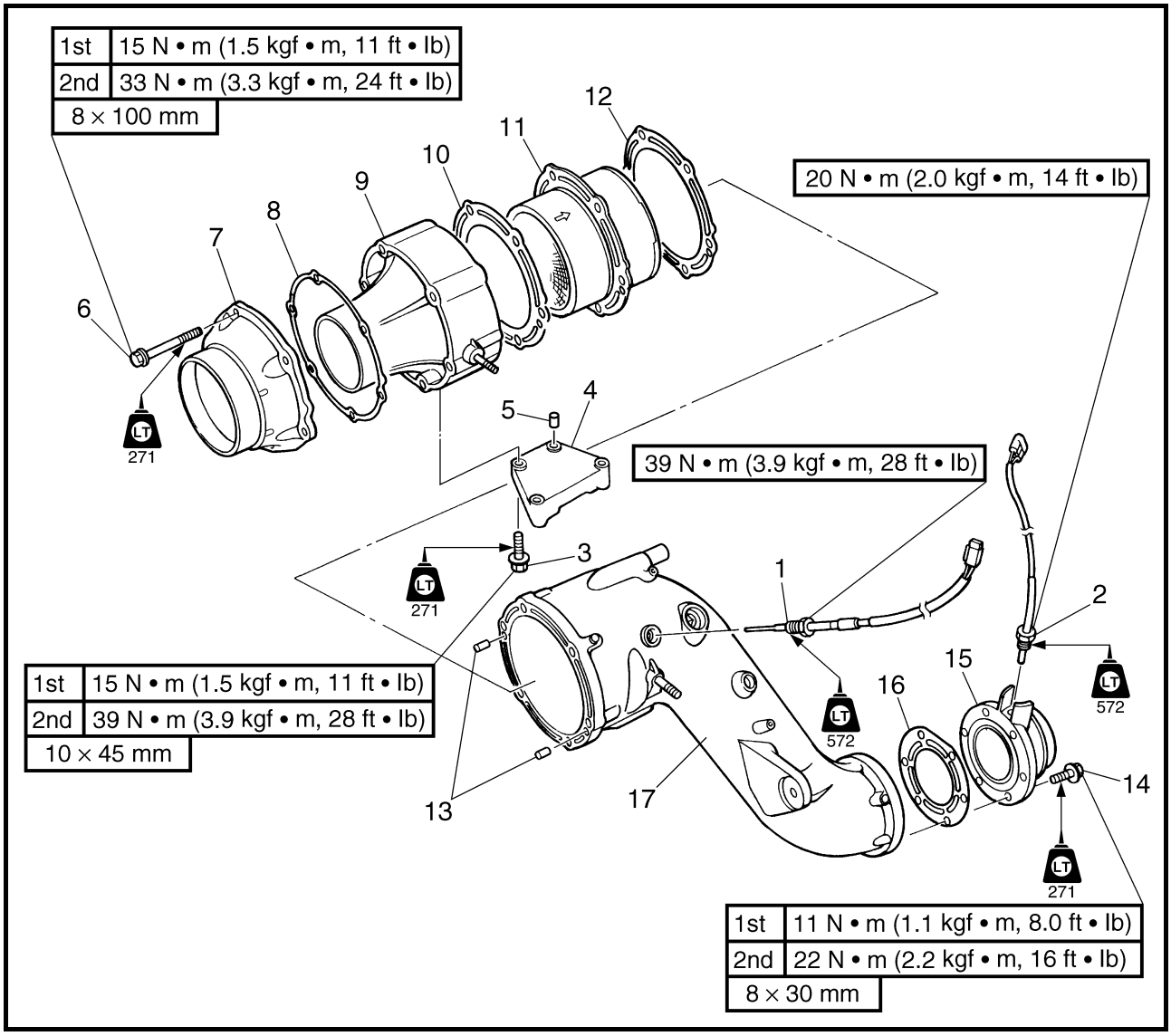
EXPLODED DIAGRAM


1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 33 N • m (3.3 kgf • m, 24 ft • lb)
8 × 100 mm
20 N • m (2.0 kgf • m, 14 ft • lb)
39 N • m (3.9 kgf • m, 28 ft • lb)
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 39 N • m (3.9 kgf • m, 28 ft • lb)
10 × 45 mm
1st 11 N • m (1.1 kgf • m, 8.0 ft • lb)
2nd 22 N • m (2.2 kgf • m, 16 ft • lb)
8 × 30 mm
271
572
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

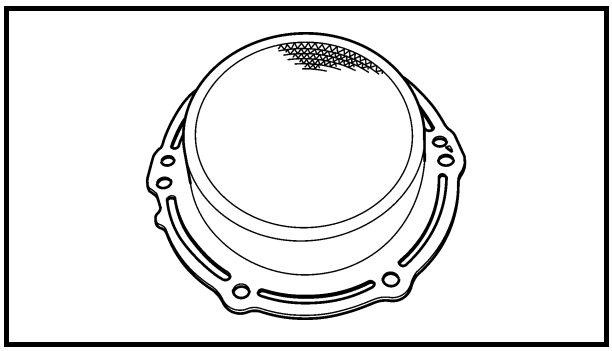
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	MUFFLER DISASSEMBLY		Follow the left "Step" for disassembly.
1	Exhaust temperature sensor	1	
2	Cooling water temperature sensor	1	
3	Bolt	2	
4	Muffler stay	1	
5	Dowel pin	1	
6	Bolt	6	
7	Cover	1	
8	Gasket	1	**Not reusable**
9	Catalytic converter housing	1	
10	Gasket	1	**Not reusable**

EXPLODED DIAGRAM


1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 33 N • m (3.3 kgf • m, 24 ft • lb)
8 × 100 mm
20 N • m (2.0 kgf • m, 14 ft • lb)
39 N • m (3.9 kgf • m, 28 ft • lb)
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 39 N • m (3.9 kgf • m, 28 ft • lb)
10 × 45 mm
1st 11 N • m (1.1 kgf • m, 8.0 ft • lb)
2nd 22 N • m (2.2 kgf • m, 16 ft • lb)
8 × 30 mm
271
572
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

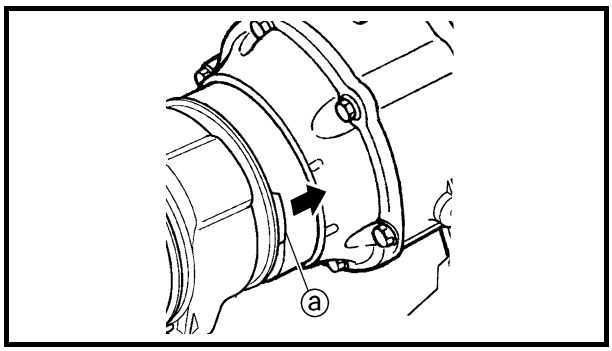
Step	Procedure/Part name	Q'ty	Service points
11	Catalytic converter	1	
12	Gasket	1	**Not reusable**
13	Pin	2	
14	Bolt	6	
15	Mixing joint	1	
16	Gasket	1	**Not reusable**
17	Muffler	1	
			Reverse the disassembly steps for assembly.



SERVICE POINTS

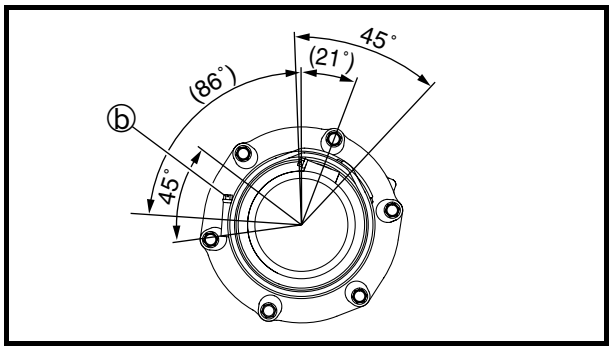
Catalytic converter inspection

1. Check:
   - Catalytic converter
     Cracks/damage → Replace.



Muffler installation

1. Install:
   - Inner exhaust joint
   - Outer exhaust joint
   - Muffler assembly
   - Inner exhaust joint screw clamp
   - Outer exhaust joint screw clamp

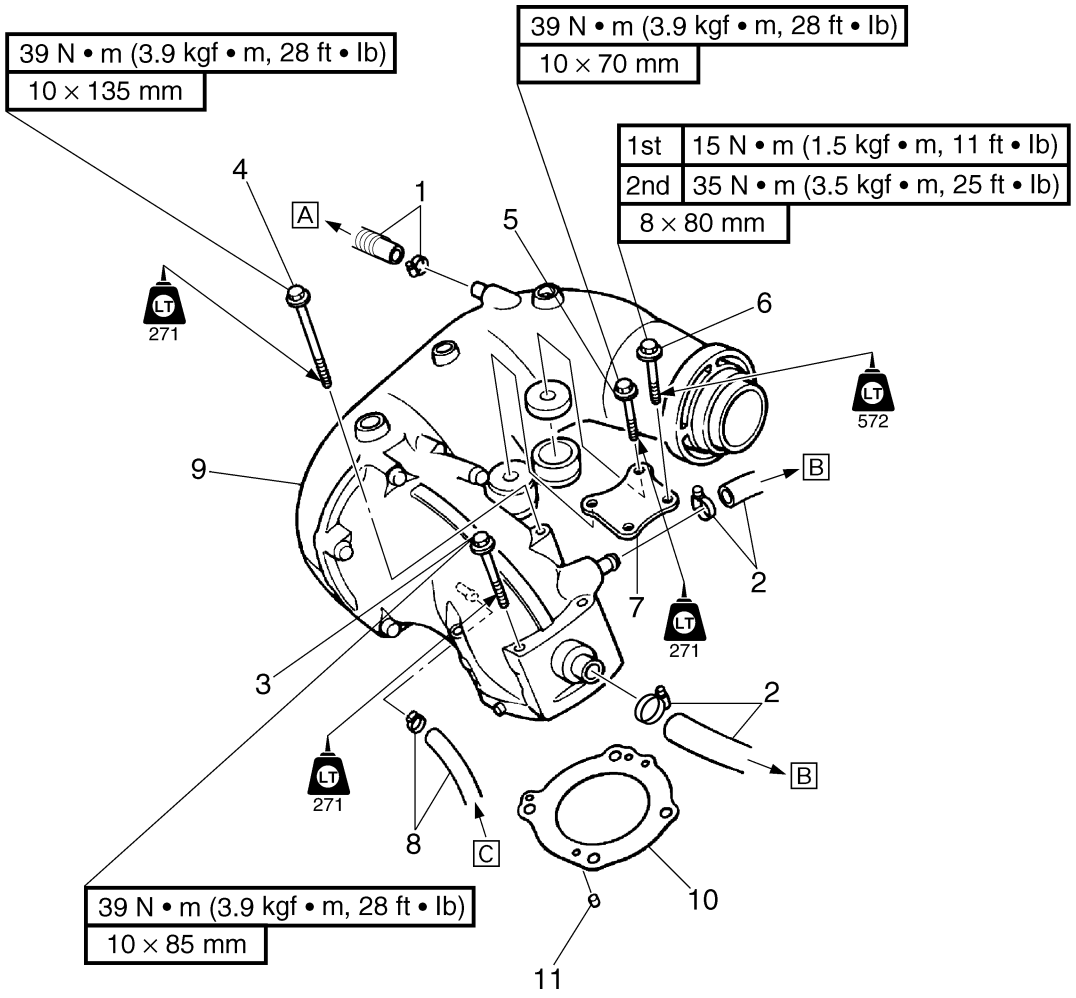


NOTE:

- Align the projection ⓐ on the exhaust joint with the muffler assembly boss.
- Use the angles shown in the illustration as reference to Install the exhaust joint screw clamps.
- Align the parting line of the outer exhaust joint with the top ⓑ of the outer exhaust joint screw clamp.

EXHAUST CHAMBER ASSEMBLY

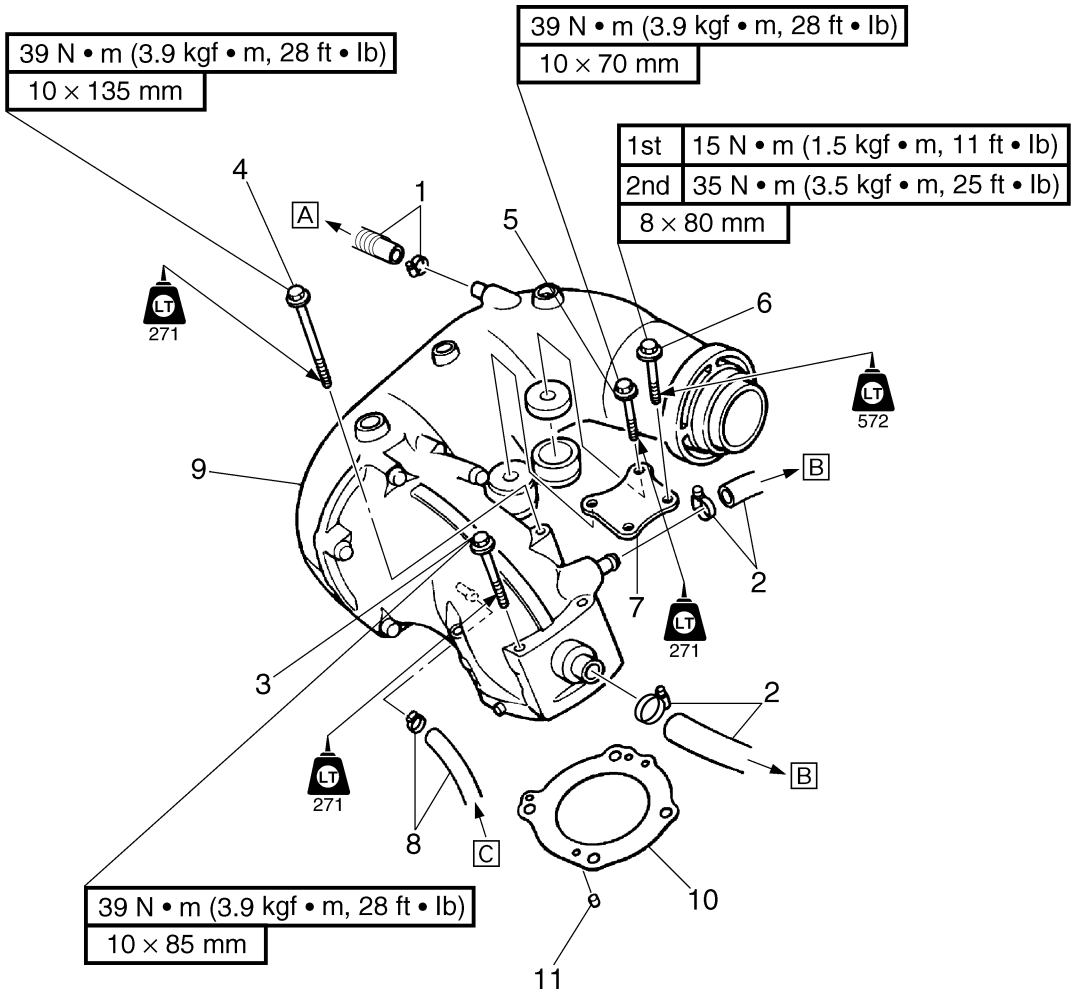
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

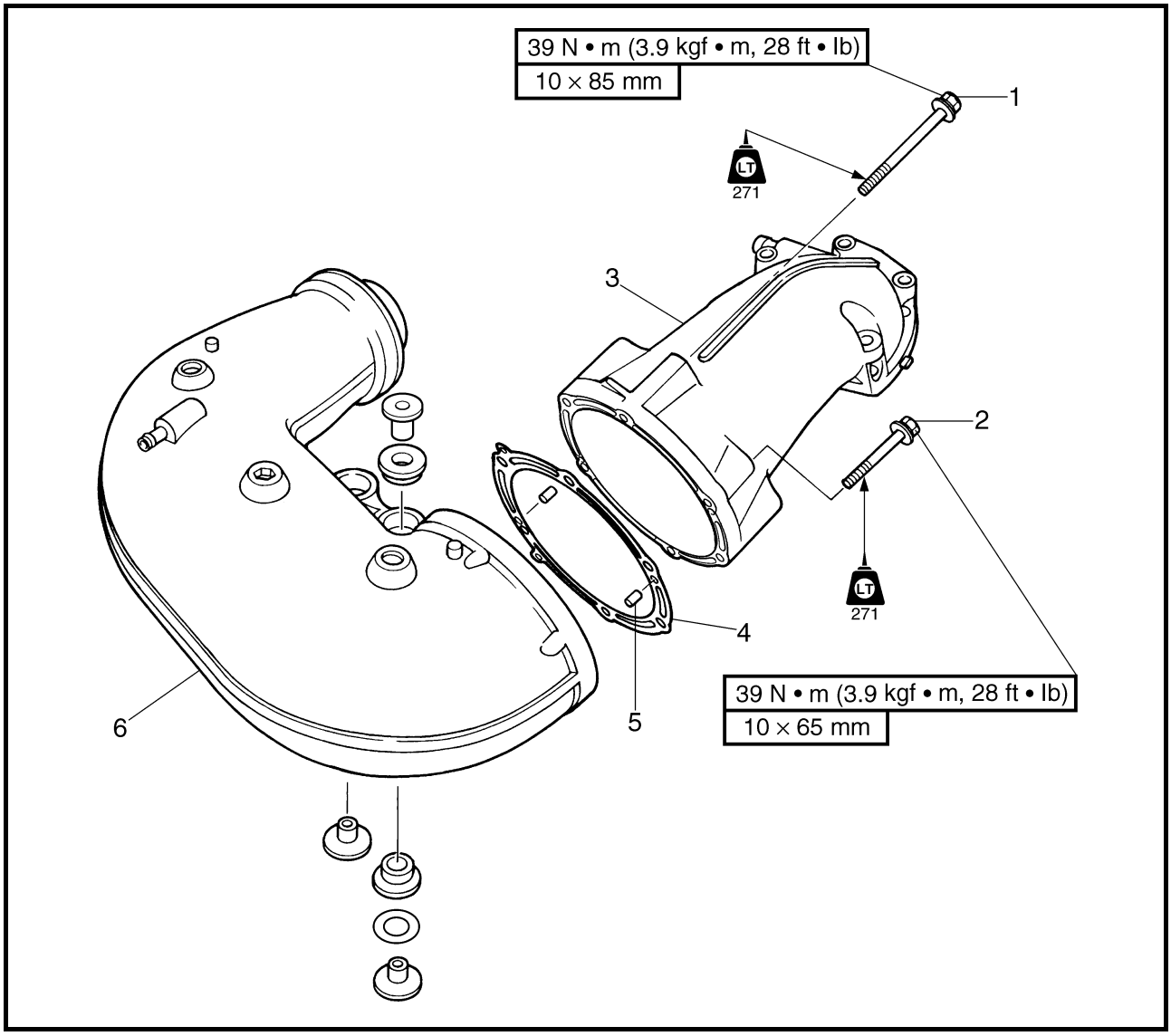
Step	Procedure/Part name	Q'ty	Service points
	EXHAUST CHAMBER ASSEMBLY REMOVAL		Follow the left "Step" for removal.
	Muffler assembly		Refer to "MUFFLER ASSEMBLY."
1	Screw clamp/cooling water hose	1/1	A To cooling water pilot outlet (starboard)
2	Screw clamp/cooling water hose	2/2	B To cylinder head
3	Bolt	3	
4	Bolt	1	
5	Bolt	2	
6	Bolt	2	
7	Exhaust chamber stay	1	

EXPLODED DIAGRAM


39 N • m (3.9 kgf • m, 28 ft • lb)
10 × 135 mm
39 N • m (3.9 kgf • m, 28 ft • lb)
10 × 70 mm
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 35 N • m (3.5 kgf • m, 25 ft • lb)
8 × 80 mm
39 N • m (3.9 kgf • m, 28 ft • lb)
10 × 85 mm
A
B
C
LT
271
572

Step	Procedure/Part name	Q'ty	Service points
8	Screw clamp/cooling water hose	1/1	C From exhaust manifold
9	Exhaust chamber assembly	1	**NOTE:** Before installing the exhaust chamber assembly, connect the cooling water hose and fasten it with the screw clamp to the exhaust chamber (part 8) and place the bolts (part 3) in the bolt holes in the exhaust chamber assembly.
10	Gasket	1	**Not reusable**
11	Pin	2	Reverse the removal steps for installation.

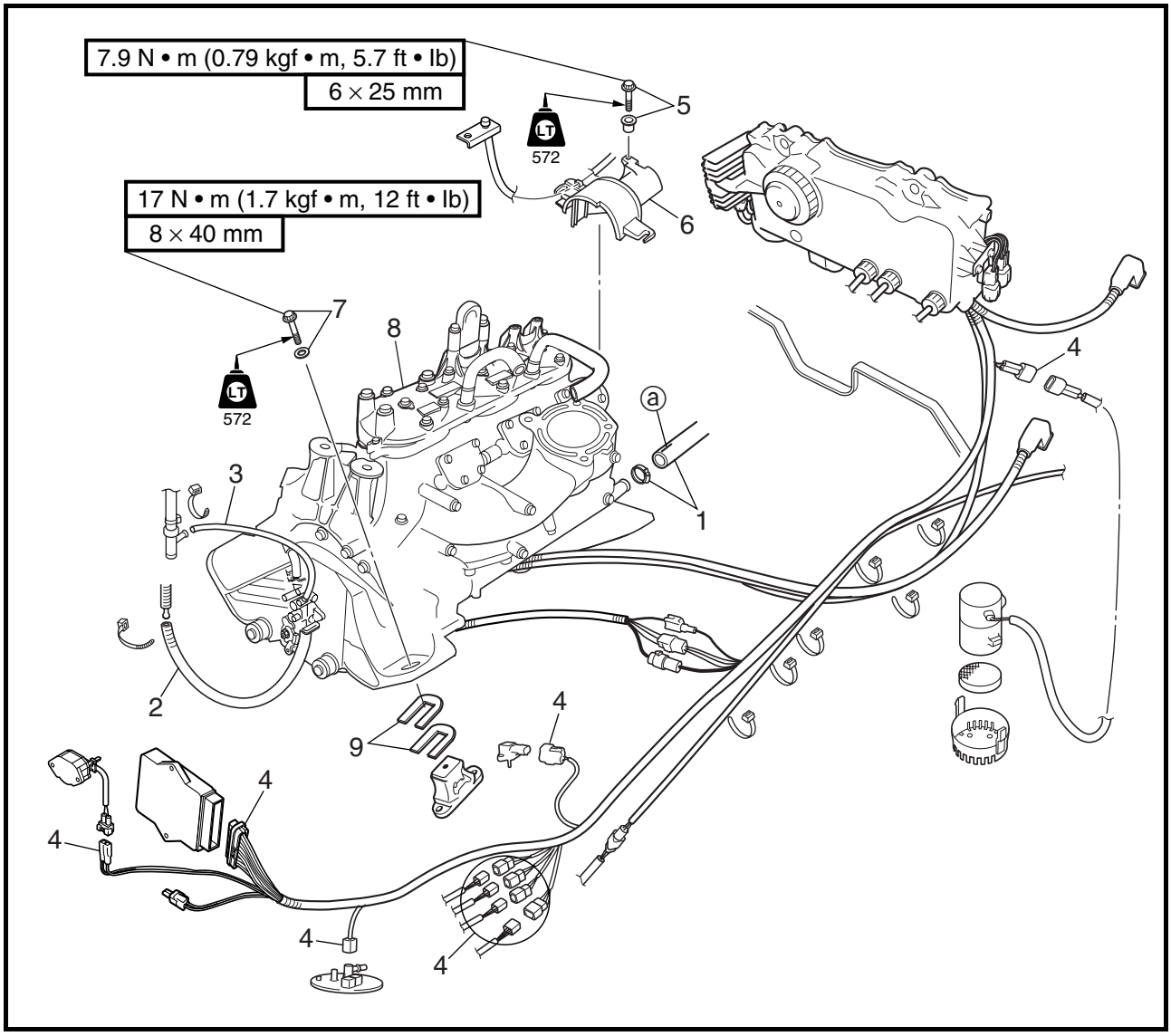
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	EXHAUST CHAMBER DISASSEMBLY		Follow the left "Step" for disassembly.
1	Bolt	5	
2	Bolt	1	
3	Exhaust chamber joint	1	
4	Gasket	1	**Not reusable**
5	Pin	2	
6	Exhaust chamber	1	
			Reverse the disassembly steps for assembly.

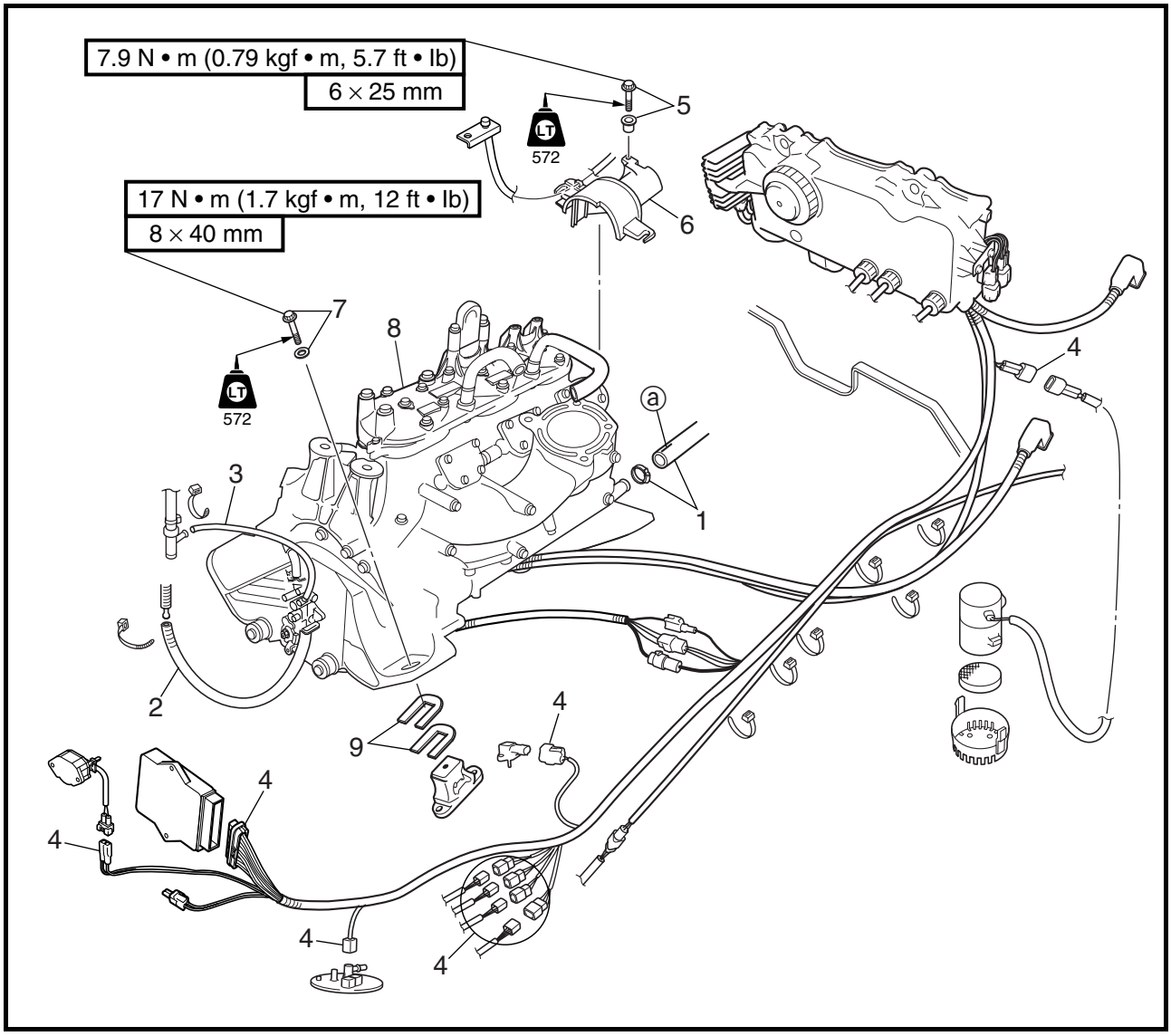
ENGINE UNIT
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ENGINE UNIT REMOVAL		Follow the left "Step" for removal.
	Muffler assembly		Refer to "MUFFLER ASSEMBLY."
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY."
	Silencer pipe and intake duct		Refer to "INTAKE DUCT AND INTAKE SILENCER" in Chapter 4.
	Throttle bodies assembly		Refer to "FUEL INJECTION SYSTEM" in Chapter 4.
	Oil pump cable		Refer to "OIL PUMP" in Chapter 4.
1	Screw clamp/cooling water hose	1/1	Install the cooling water hose with the white paint mark ⓐ facing up.
2	Oil suction hose	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
3	Oil return hose	1	
4	Coupler	9	
5	Bolt/collar	1/1	
6	Coupling cover	1	
7	Bolt/washer	4/4	
8	Engine unit	1	
9	Shim	—	As required **NOTE:** Install shims in their original positions. Reverse the removal steps for installation.

SERVICE POINTS

Shim removal

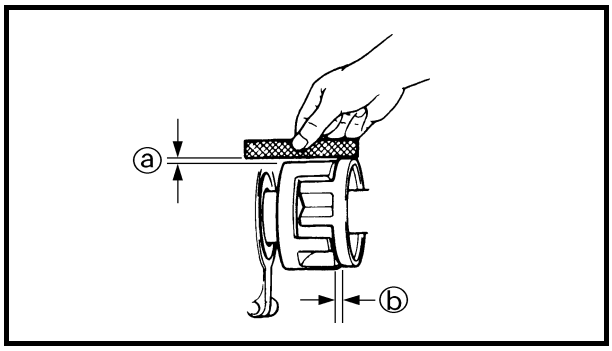
1. Remove:
   - Shims

NOTE:

To ease reassembly and coupling alignment, remove the shims and organize them in their respective groups (e.g., front right, rear left) prior to removing the mounting bolts.

Engine mount inspection

1. Check:
   - Engine mounts
     Cracks/damage → Replace.
     Refer to "ENGINE MOUNTS" in Chapter 8.



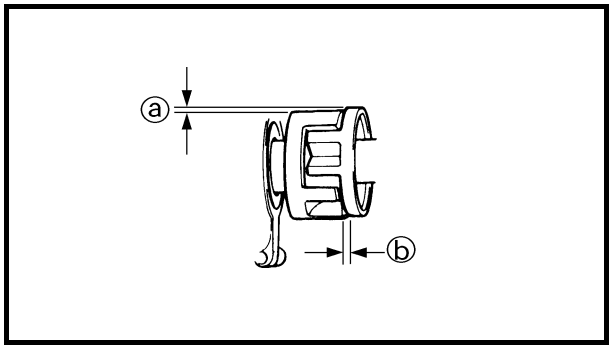
Coupling clearance inspection

1. Measure:
   - Clearance ⓐ
   - Clearance ⓑ
     (with the rubber damper)
     Out of specification → Adjust.

NOTE:

Measure the clearances using a straightedge and thickness gauge.

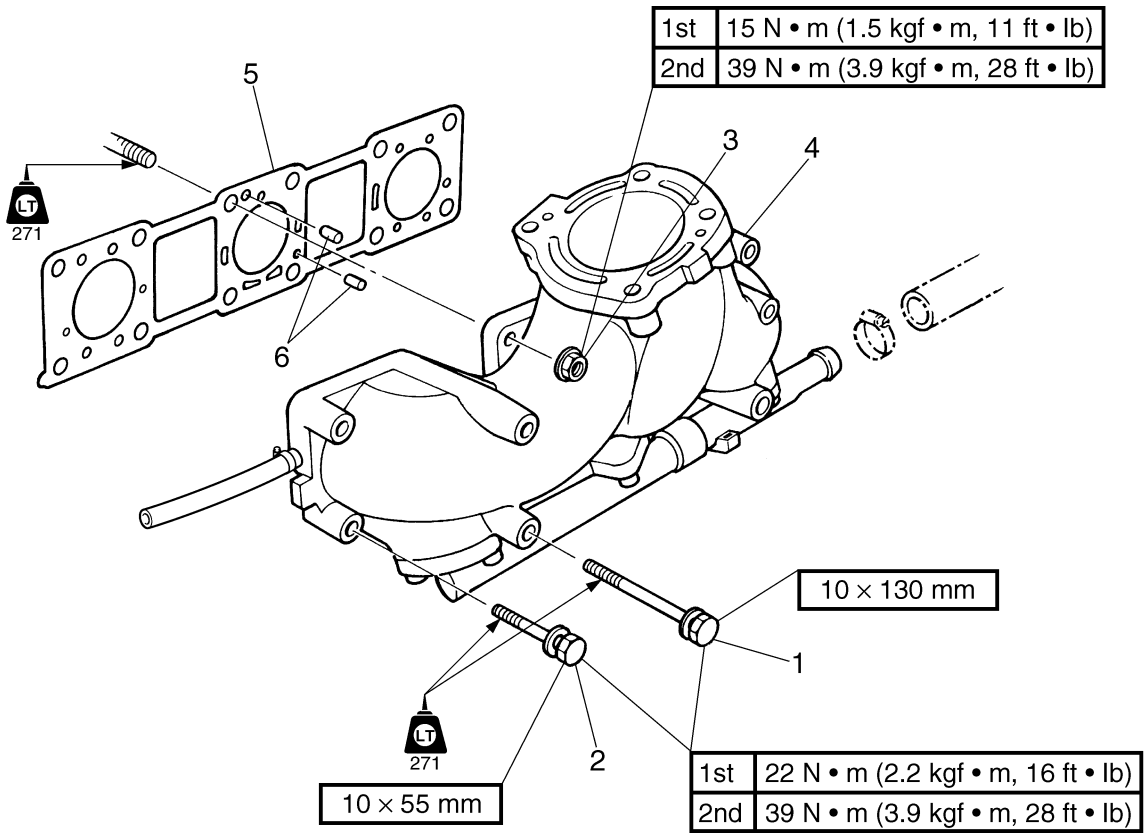
Clearance ⓐ:
0–0.5 mm (0–0.020 in)
Clearance ⓑ:
2–4 mm (0.079–0.157 in)



2. Adjust:
   - Clearances ⓐ and ⓑ

Adjustment steps:
- Adjust the clearance ⓐ by adding or removing shims.
- Adjust the clearance ⓑ by moving the engine unit position.

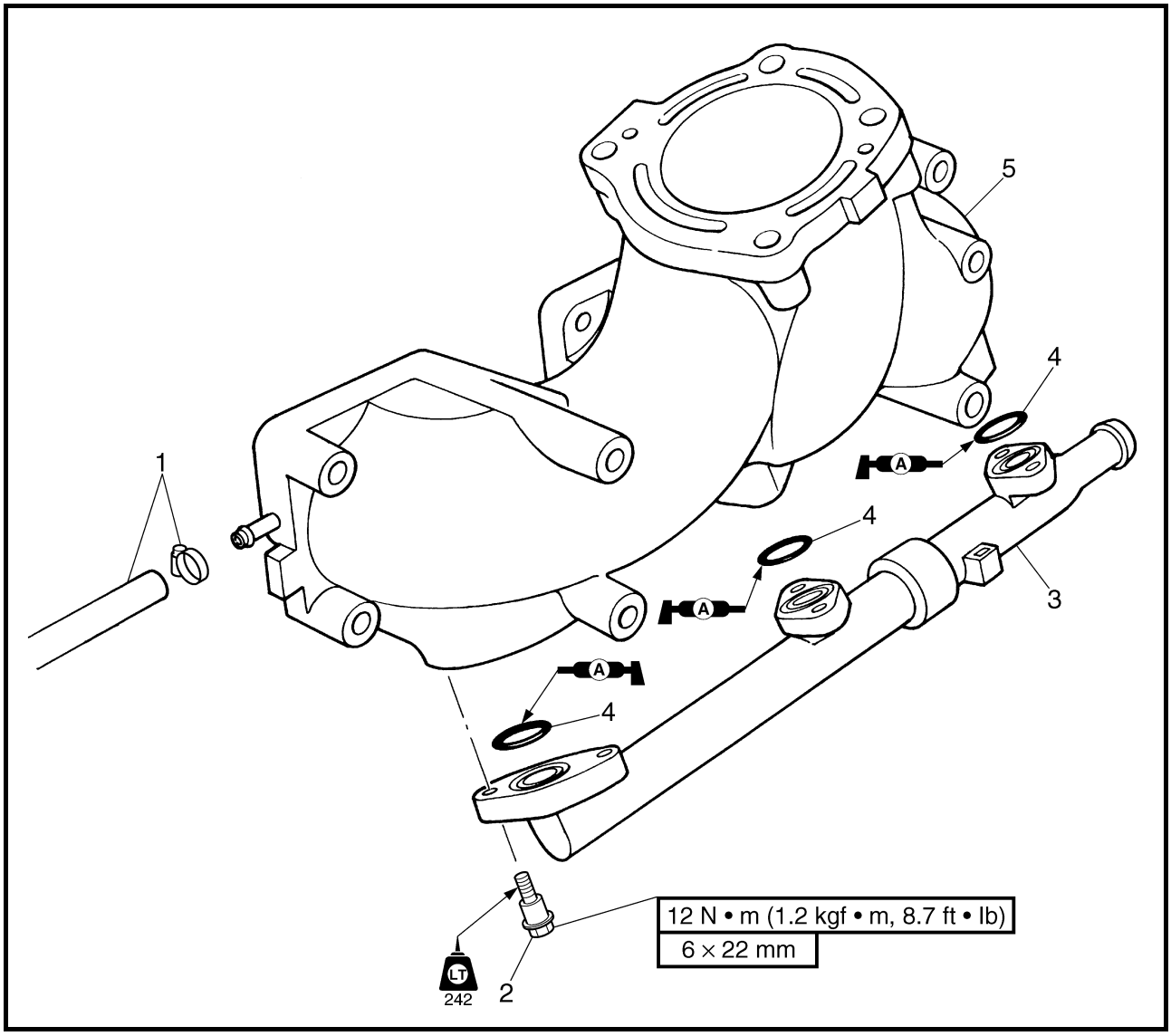
EXHAUST MANIFOLD
EXPLODED DIAGRAM


1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 39 N • m (3.9 kgf • m, 28 ft • lb)
5
3
4
LT
271
6
10 × 130 mm
1
LT
271
2
10 × 55 mm
1st 22 N • m (2.2 kgf • m, 16 ft • lb)
2nd 39 N • m (3.9 kgf • m, 28 ft • lb)

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	EXHAUST MANIFOLD REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT."
1	Bolt	4	
2	Bolt	6	
3	Nut	2	
4	Exhaust manifold	1	
5	Gasket	1	**Not reusable**
6	Pin	2	
			Reverse the removal steps for installation.

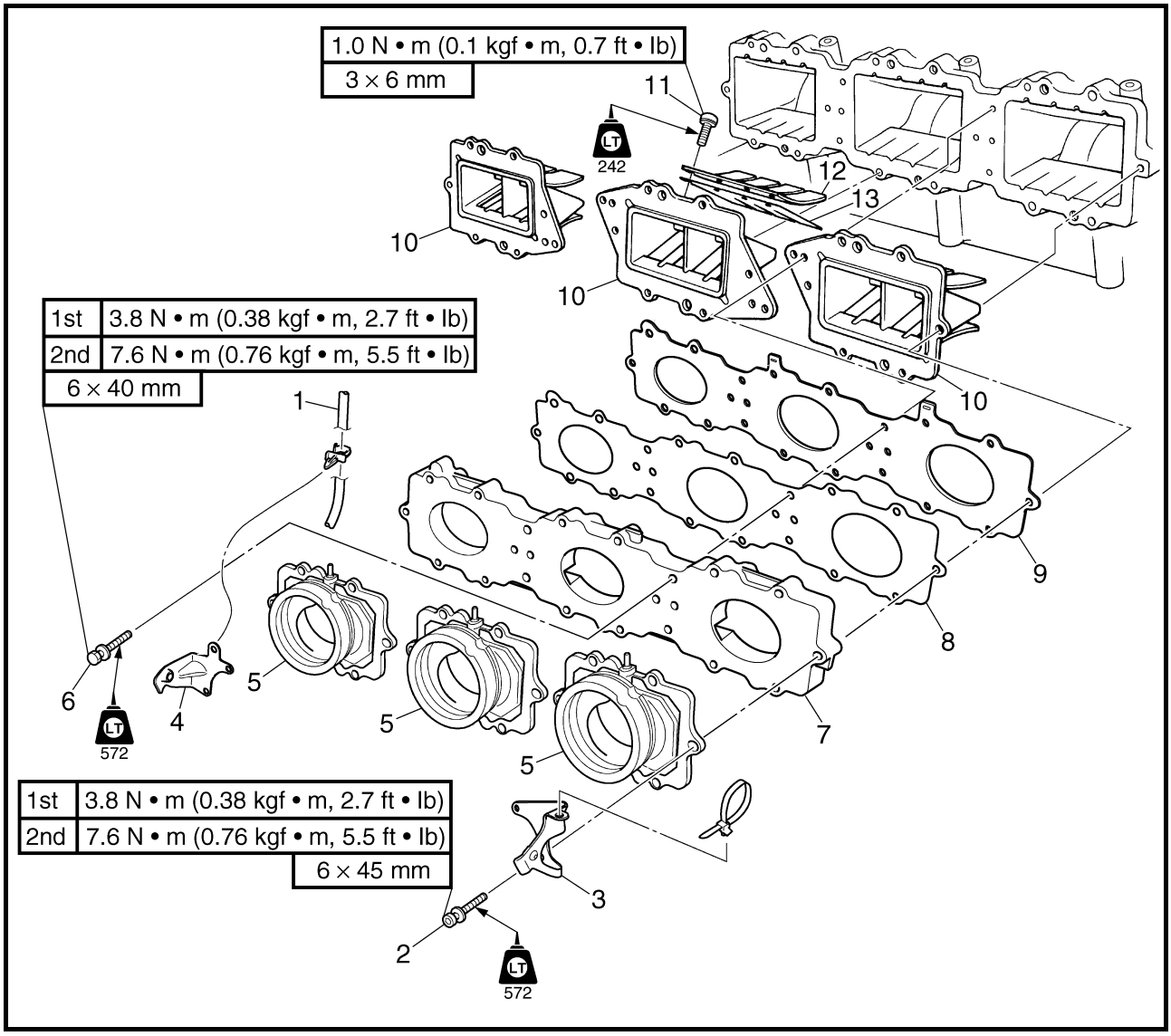
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	EXHAUST MANIFOLD DISASSEMBLY		Follow the left "Step" for disassembly.
1	Screw clamp/cooling water hose	1/1	
2	Bolt	6	
3	Cooling water joint	1	
4	O-ring	3	**Not reusable**
5	Exhaust manifold	1	
			Reverse the disassembly steps for assembly.

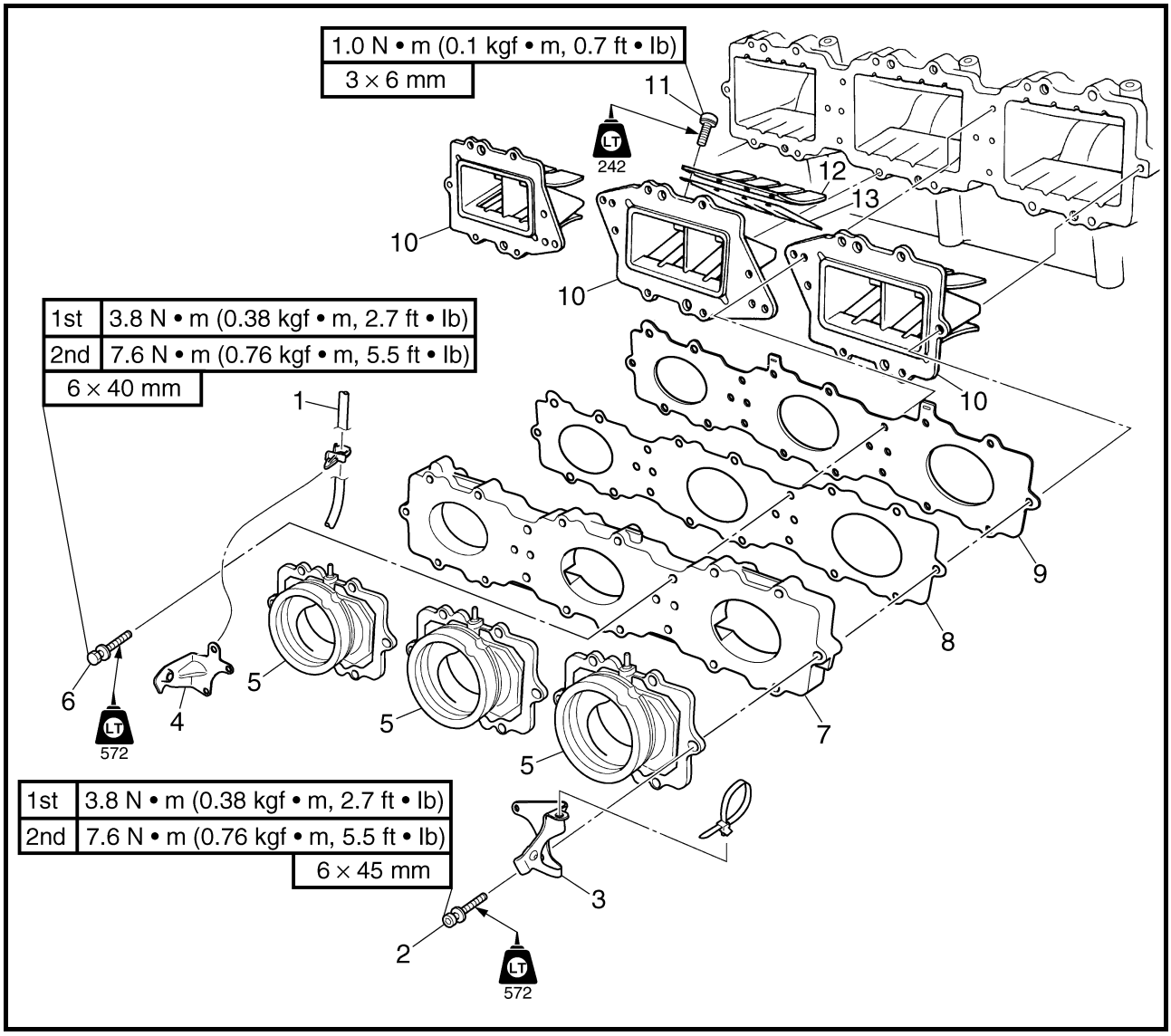
REED VALVES
EXPLODED DIAGRAM



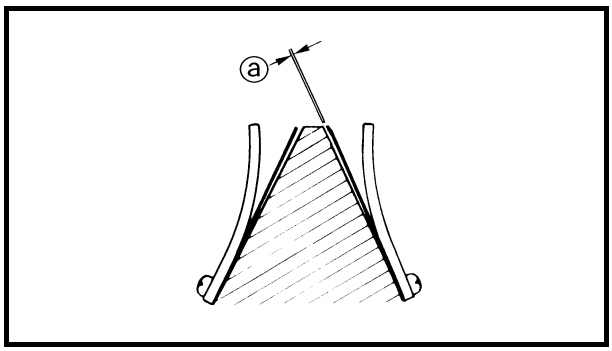
REMOVAL AND INSTALLATION CHART

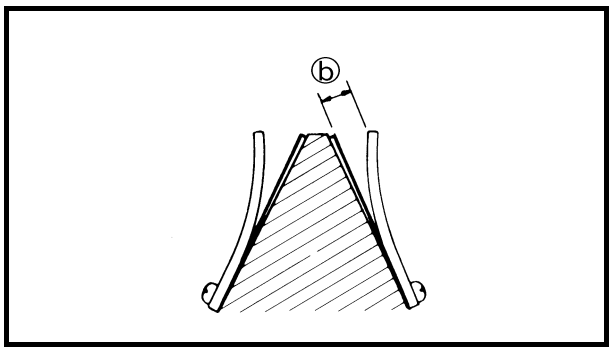
Step	Procedure/Part name	Q'ty	Service points
	REED VALVE REMOVAL		Follow the left "Step" for removal.
	Throttle bodies assembly		Refer to "FUEL INJECTION SYSTEM" in Chapter 4.
	Oil delivery hoses		Refer to "OIL PUMP" in Chapter 4.
1	Grease hose	1	
2	Bolt	18	
3	Throttle bodies bracket 1	1	
4	Throttle bodies bracket 2	1	
5	Throttle bodies joint	3	
6	Bolt	4	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Balance plate	1	
8	Gasket	1	**Not reusable**
9	Reed valve plate	1	
10	Reed valve assembly	3	
11	Screw	24	
12	Valve stopper	6	
13	Reed valve	6	
			Reverse the removal steps for installation.





SERVICE POINTS

Reed valve inspection

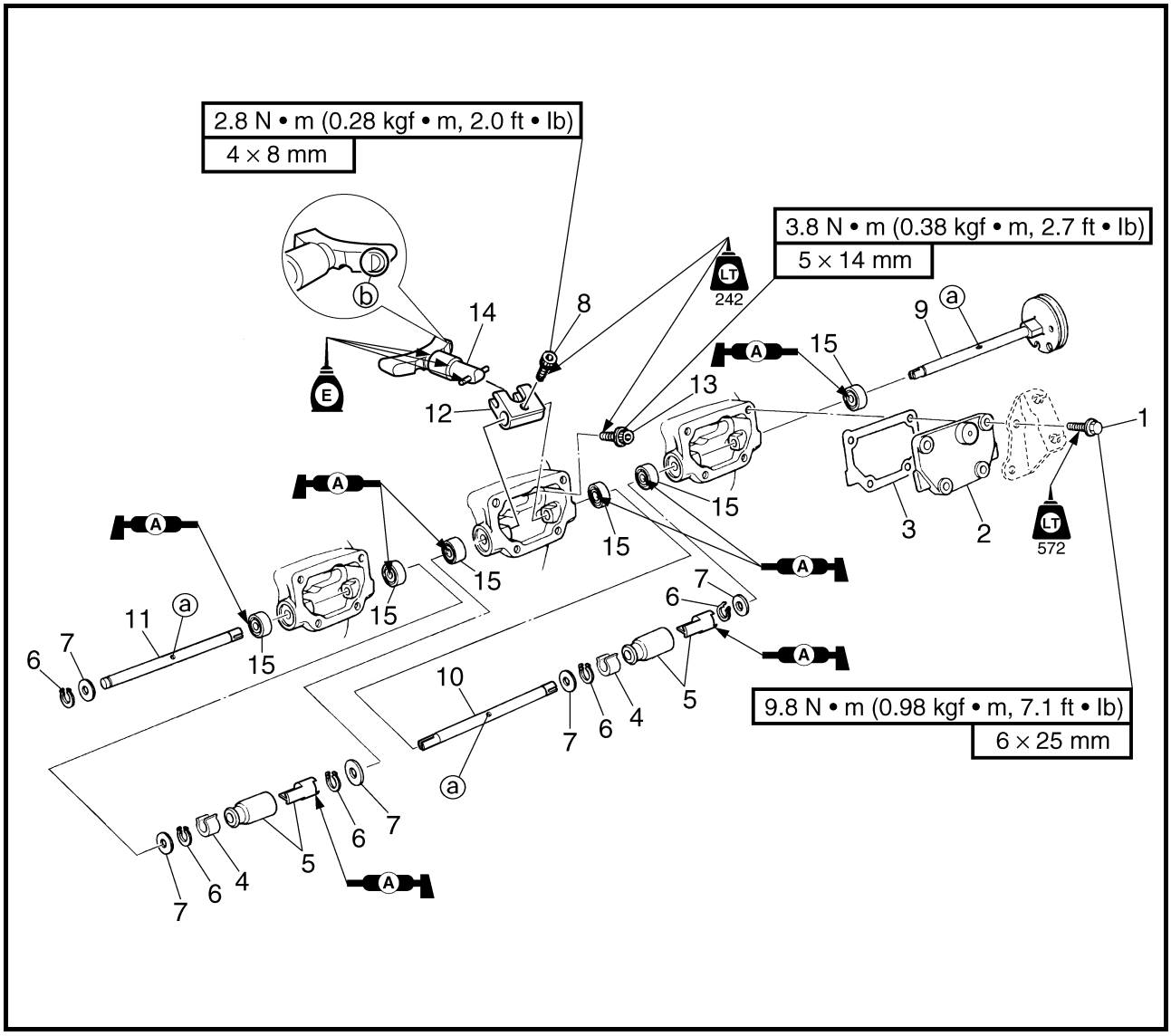
1. Check:
   - Reed valves
     Cracks/damage → Replace.
2. Measure:
   - Valve warpage ⓐ
     Out of specification → Replace.

Valve warpage limit:
1.5 mm (0.059 in)

3. Measure:
   - Valve stopper height ⓑ
     Out of specification → Replace.

Valve stopper height:
10.5–10.9 mm (0.413–0.429 in)

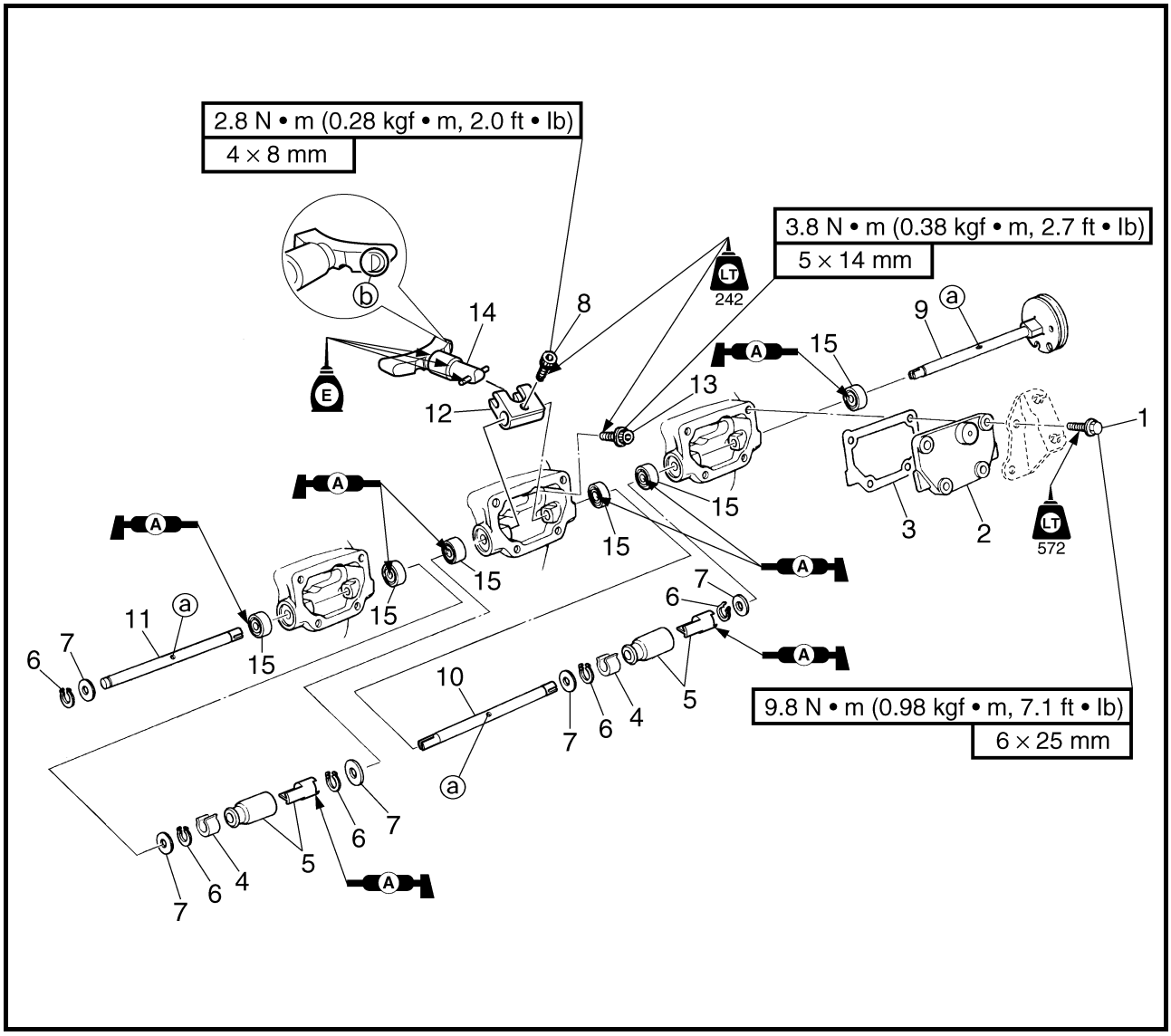
YPVS
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

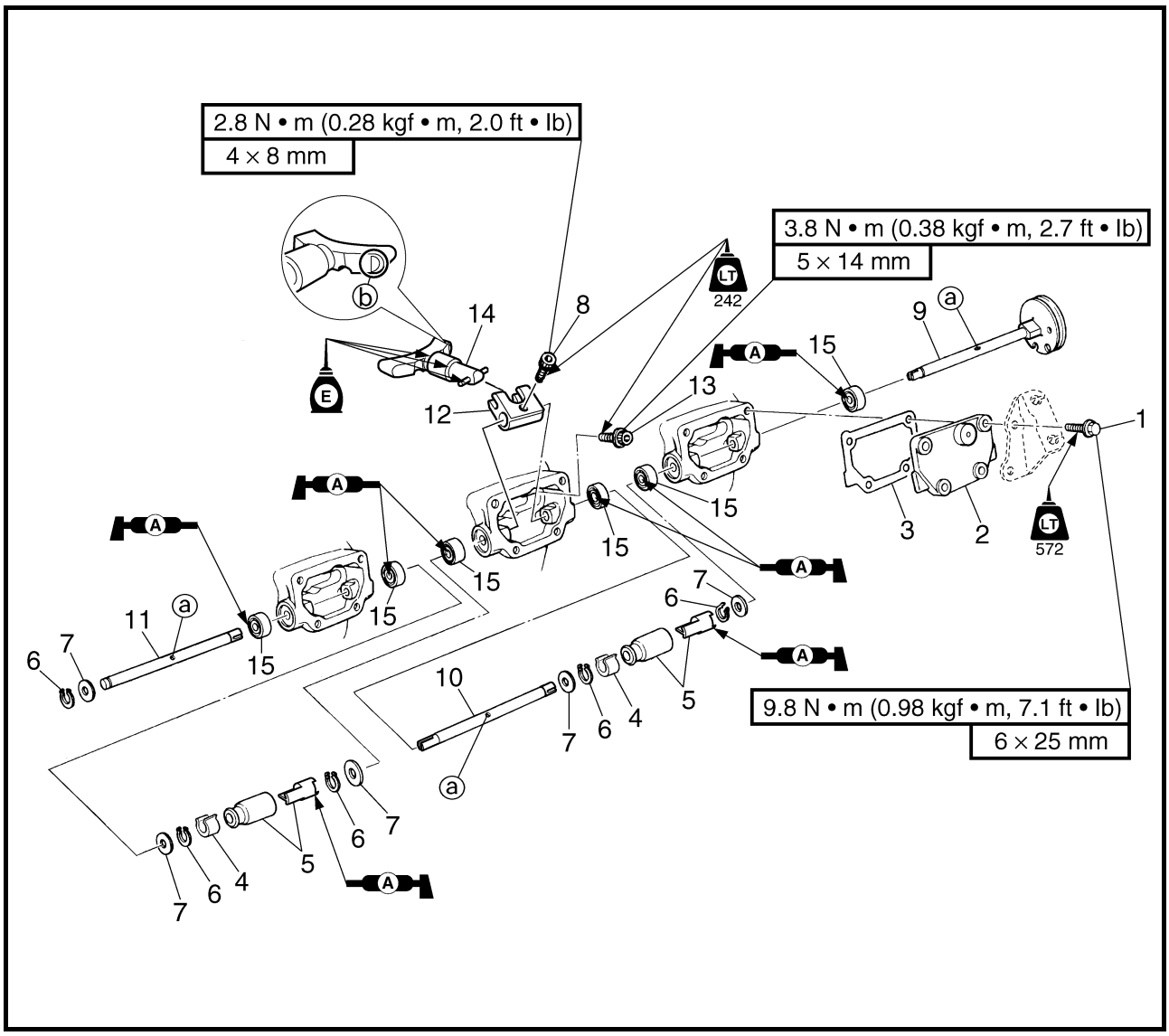
Step	Procedure/Part name	Q'ty	Service points
	YPVS REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY."
1	Bolt	12	
2	YPVS valve cover	3	
3	Gasket	3	**Not reusable**
4	Spacer	2	
5	Link joint/cover	2/2	
6	Circlip	5	**Not reusable**
7	Washer	5	

EXPLODED DIAGRAM

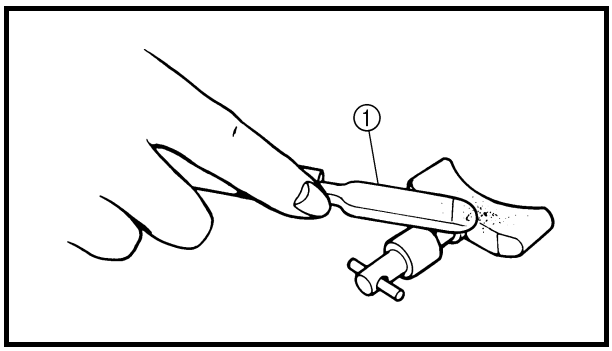


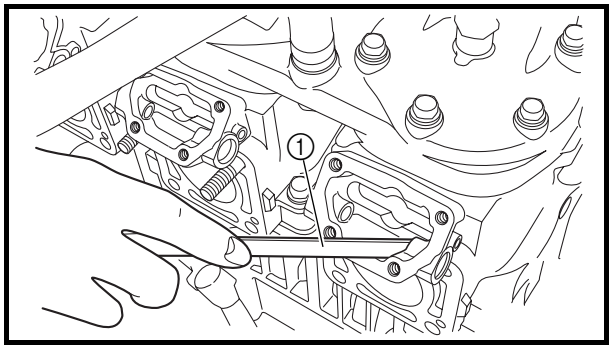
Step	Procedure/Part name	Q'ty	Service points
8	Bolt	3	**NOTE:** For installation, align the hole ⓐ in the YPVS shaft with the bolt.
9	Shaft 3	1	
10	Shaft 2	1	
11	Shaft 1	1	
12	YPVS valve arm	3	
13	Bolt	3	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
14	YPVS valve assembly	3	**NOTE:** Install the YPVS valves with the recess ⓑ facing toward the stern.
15	Oil seal	6	**NOTE:** If the YPVS shaft is removed, the oil seal must be replaced. Reverse the removal steps for installation.





SERVICE POINTS

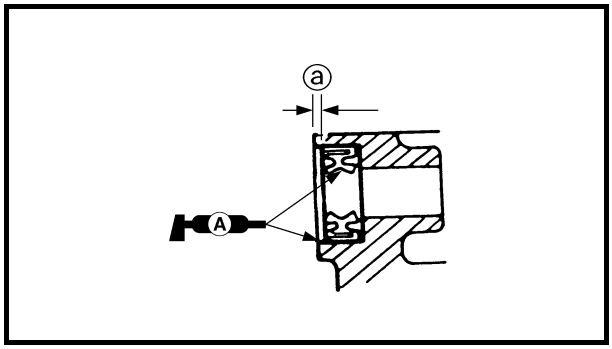
YPVS valve inspection

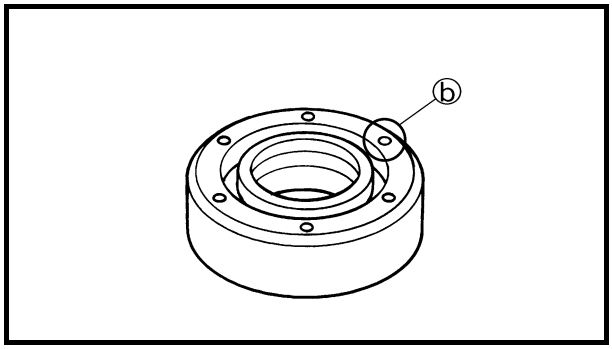
1. Eliminate:
   - Carbon deposits
     (using a rounded scraper ①)

CAUTION:

Do not use a sharp instrument to avoid damaging or scratching the surfaces.

2. Check:
   - YPVS valve assembly
     Cracks/damage/wear → Replace.





YPVS valve installation

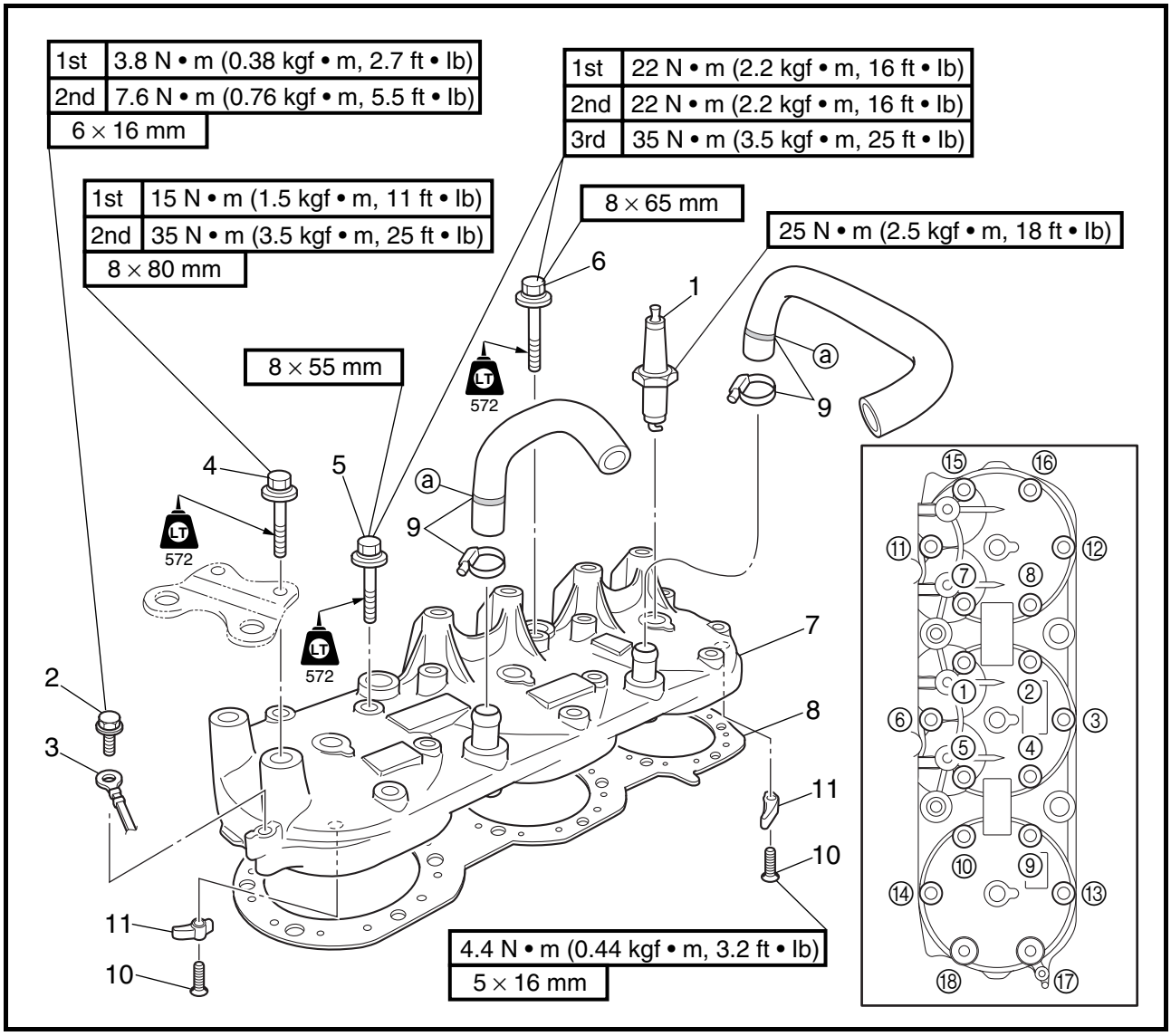
1. Install:
   - Oil seals

	Distance ⓐ: **1.0–1.5 mm (0.039–0.059 in)**

NOTE:

Install the oil seal with the marks ⓑ facing inward.

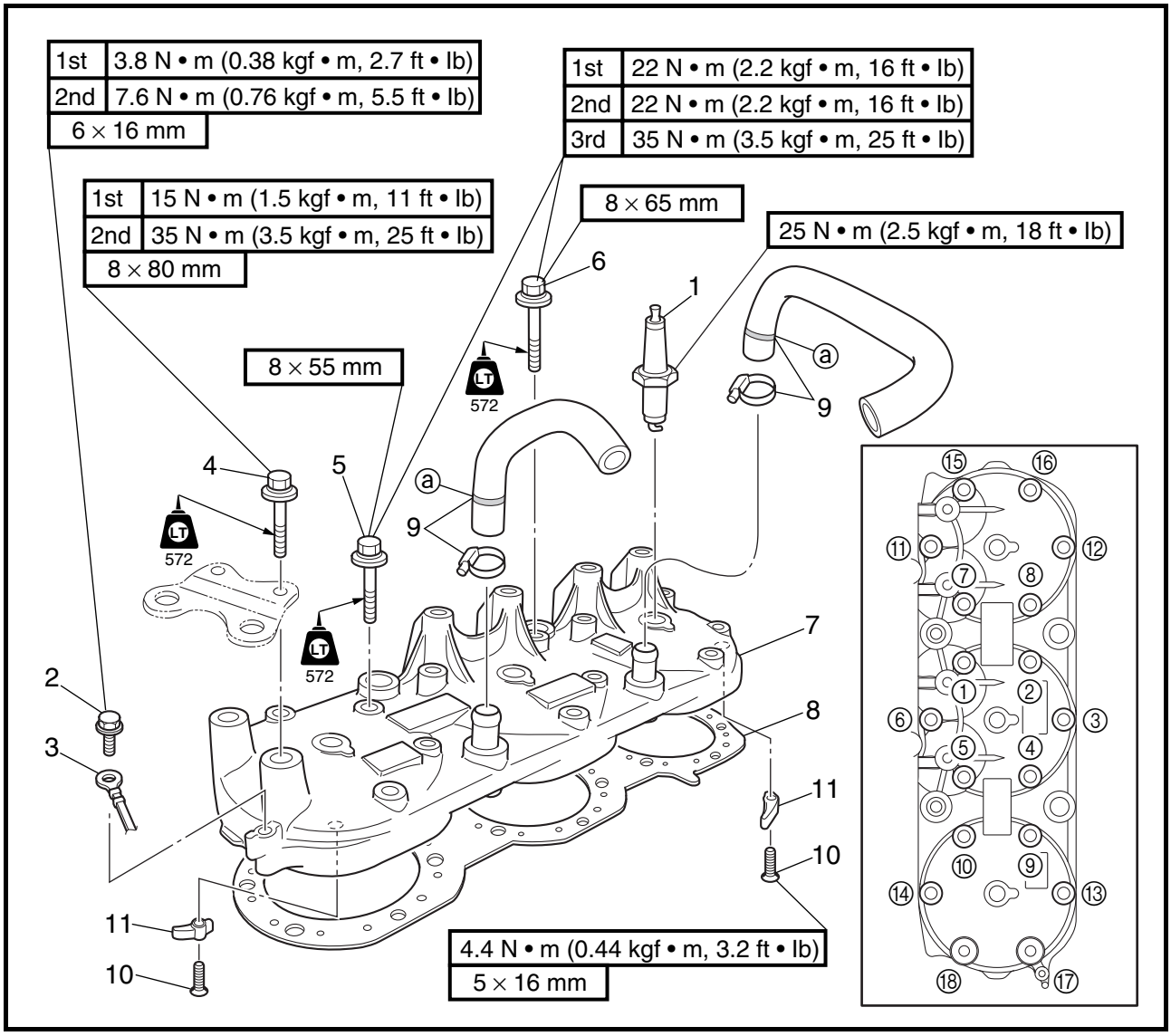
CYLINDER HEAD
EXPLODED DIAGRAM


1st 3.8 N • m (0.38 kgf • m, 2.7 ft • lb)
2nd 7.6 N • m (0.76 kgf • m, 5.5 ft • lb)
6 × 16 mm
1st 22 N • m (2.2 kgf • m, 16 ft • lb)
2nd 22 N • m (2.2 kgf • m, 16 ft • lb)
3rd 35 N • m (3.5 kgf • m, 25 ft • lb)
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 35 N • m (3.5 kgf • m, 25 ft • lb)
8 × 80 mm
8 × 65 mm
25 N • m (2.5 kgf • m, 18 ft • lb)
8 × 55 mm
572
4.4 N • m (0.44 kgf • m, 3.2 ft • lb)
5 × 16 mm

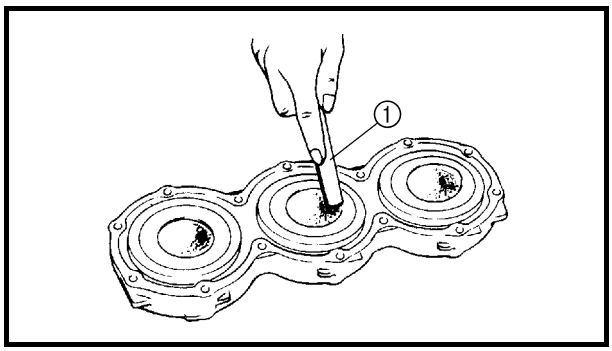
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CYLINDER HEAD REMOVAL		Follow the left "Step" for removal.
	Muffler assembly		Refer to "MUFFLER ASSEMBLY."
1	Spark plug	3	
2	Bolt	1	
3	Ground lead	1	
4	Bolt	2	**NOTE:**
5	Bolt	12	Tighten the bolts in the proper sequence as shown and in three stages. (Tighten bolts ⑰ and ⑱ in two stages.)
6	Bolt	4	

EXPLODED DIAGRAM


1st 3.8 N • m (0.38 kgf • m, 2.7 ft • lb)
2nd 7.6 N • m (0.76 kgf • m, 5.5 ft • lb)
6 × 16 mm
1st 22 N • m (2.2 kgf • m, 16 ft • lb)
2nd 22 N • m (2.2 kgf • m, 16 ft • lb)
3rd 35 N • m (3.5 kgf • m, 25 ft • lb)
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 35 N • m (3.5 kgf • m, 25 ft • lb)
8 × 80 mm
8 × 65 mm
25 N • m (2.5 kgf • m, 18 ft • lb)
8 × 55 mm
572
4.4 N • m (0.44 kgf • m, 3.2 ft • lb)
5 × 16 mm

Step	Procedure/Part name	Q'ty	Service points
7	Cylinder head	1	
8	Gasket	1	**Not reusable**
9	Screw clamp/cooling water hose	2/2	**NOTE:** Face the red mark ⓐ end of the cooling water hose toward the cylinder head cover, and then install the hose.
10	Screw	2	
11	Anode	2	
			Reverse the removal steps for installation.



SERVICE POINTS

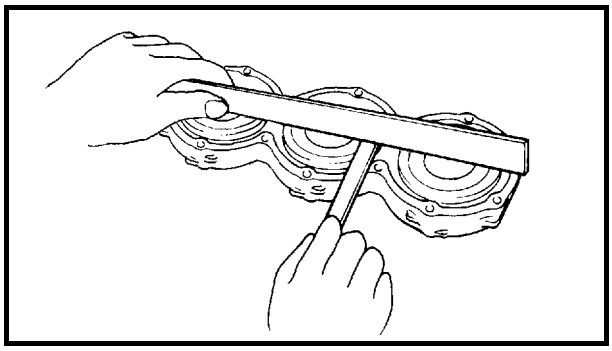
Cylinder head inspection

1. Eliminate:
   - Carbon deposits
     (using a rounded scraper ①)

CAUTION:

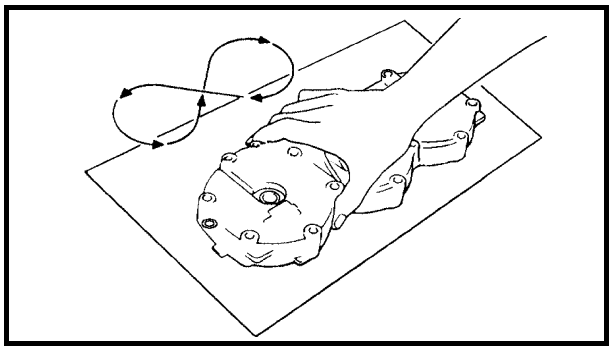
Do not use a sharp instrument to avoid damaging or scratching the cylinder head or spark plug bore threads.

2. Check:
   - Cylinder head water jacket
     Corrosion/mineral deposits → Clean or replace.



3. Measure:
   - Cylinder head warpage
     (using a straightedge and thickness gauge)
     Out of specification/score marks → Resurface.

Warpage limit:
0.05 mm (0.002 in)

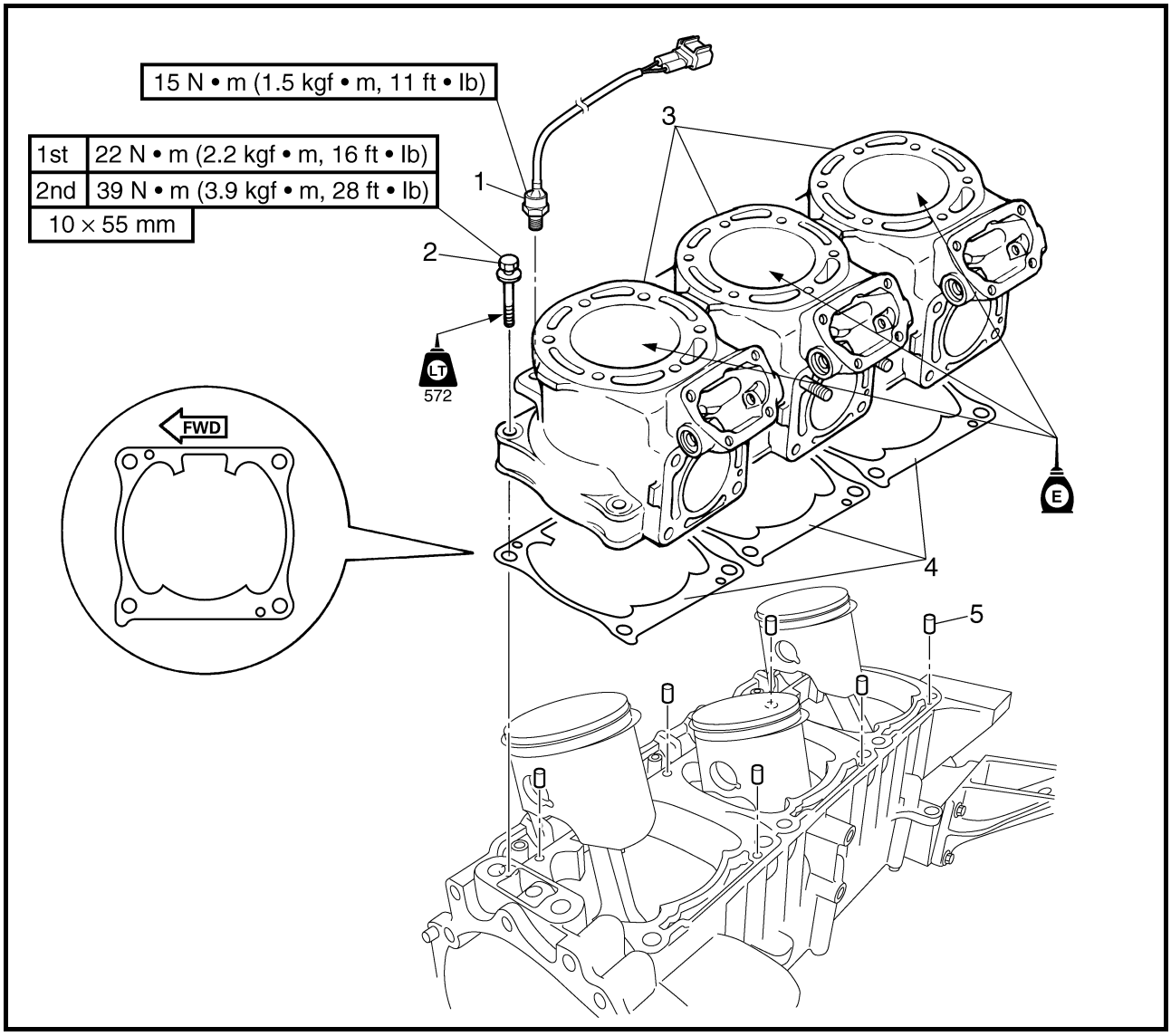


NOTE:

Place 400–600 grit wet sandpaper on a surface plate and resurface the cylinder head using a figure-eight sanding pattern.

CYLINDERS

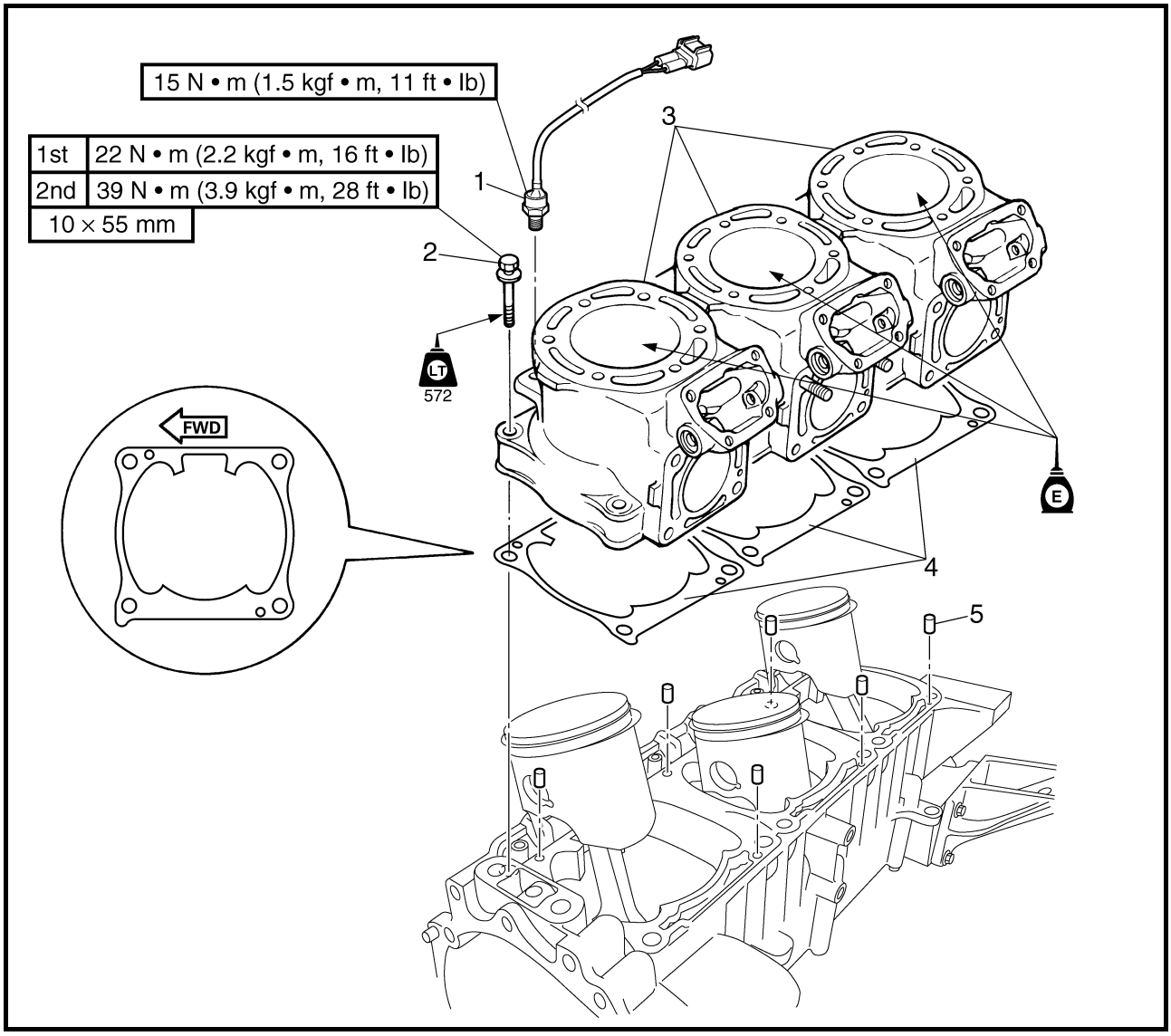
EXPLODED DIAGRAM



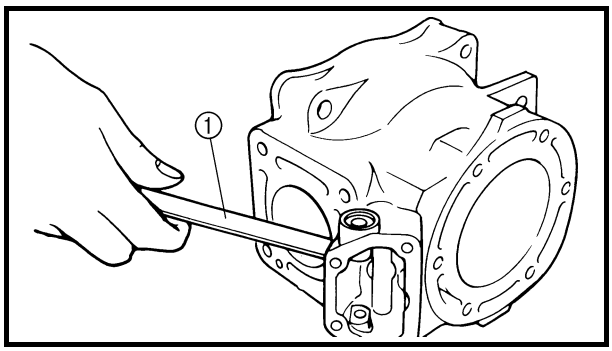
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CYLINDER REMOVAL		Follow the left "Step" for removal.
	YPVS		Refer to "YPVS."
	Cylinder head		Refer to "CYLINDER HEAD."
1	Engine temperature sensor	1	
2	Bolt	12	**NOTE:** Tighten the bolts in a crisscross pattern and in two stages.
3	Cylinder	3	**NOTE:** Install the cylinders in their original positions.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
4	Cylinder gasket	3	**Not reusable**
5	Pin	6	
			Reverse the removal steps for installation.

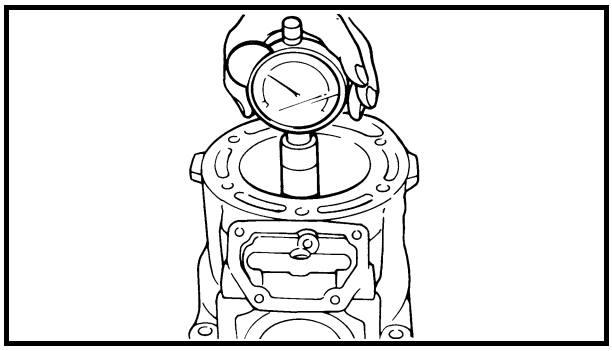


SERVICE POINTS

Cylinder inspection

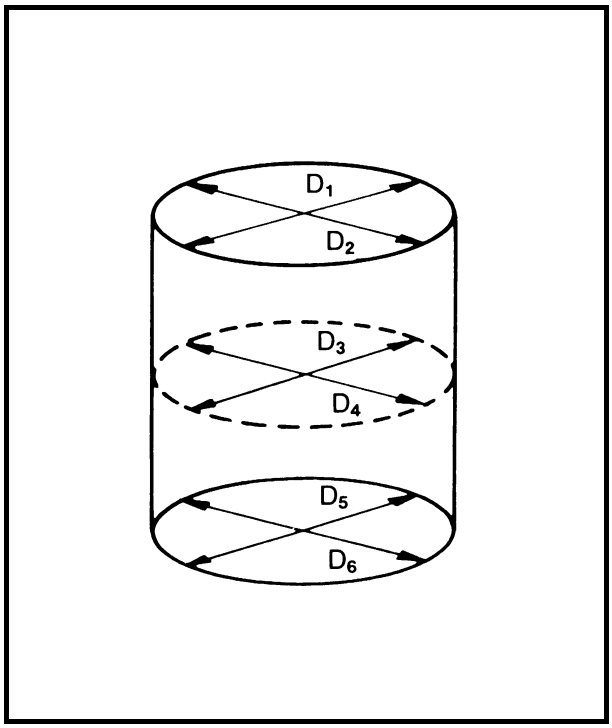
1. Eliminate:
   - Carbon deposits
     (using a rounded scraper ①)

2. Check:
   - Cylinder water jacket
     Corrosion/mineral deposits → Clean or replace.
   - Cylinder inner surface
     Score marks → Replace.



3. Measure:
   - Cylinder bore "D"
     (using a cylinder gauge)
     Out of specification → Replace cylinder and piston as a set.

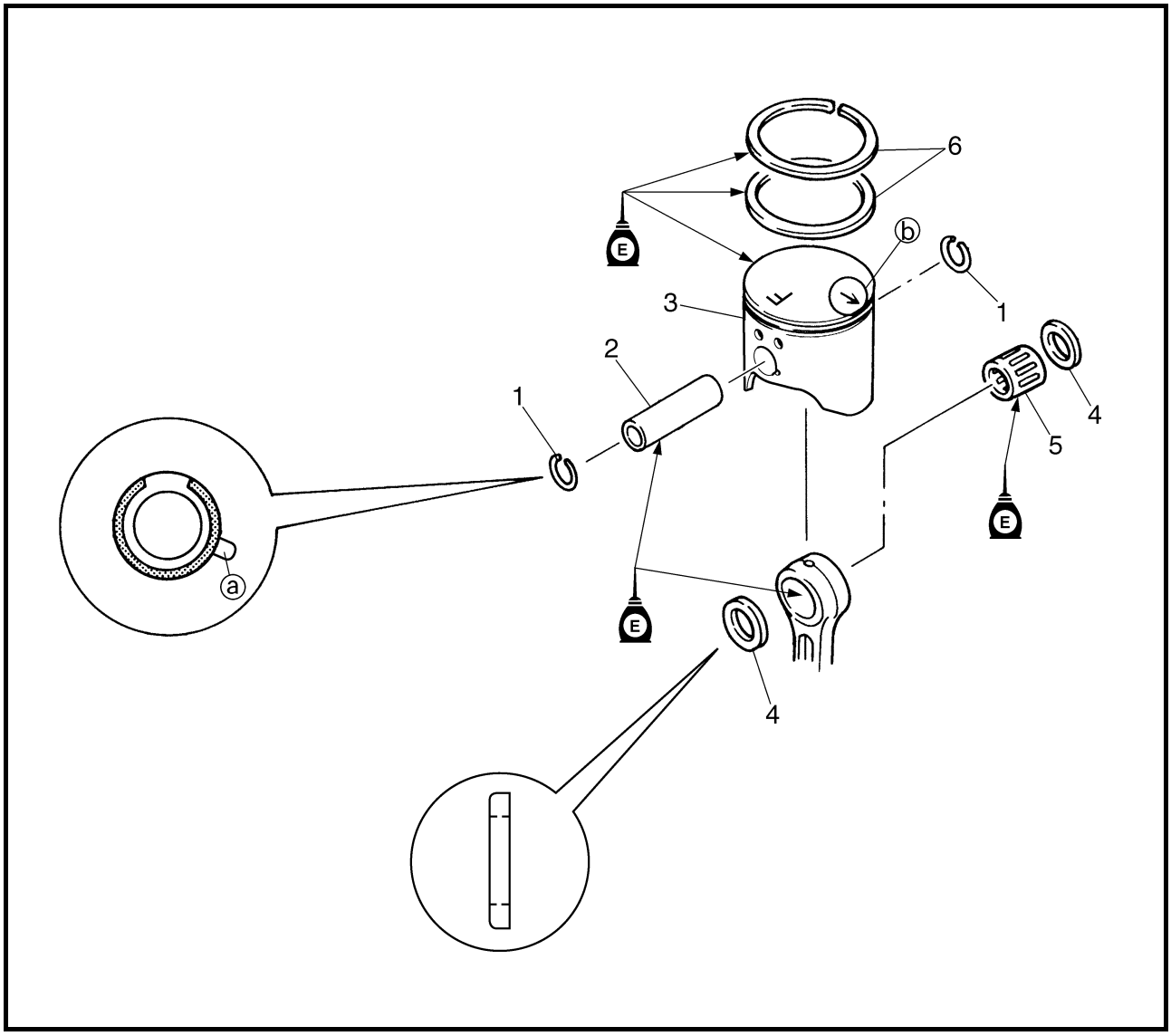
NOTE:
Measure the cylinder bore parallel to and at a right angle to the crankshaft. Then, average the measurements.



	Standard	Limit
Cylinder bore "D"	84.000–84.018 mm (3.3071–3.3078 in)	84.100 mm (3.3110 in)
Taper "T"	—	0.080 mm (0.0031 in)
Out of round "R"	—	0.050 mm (0.0020 in)

D = Maximum (D_1–D_6)
T = (Maximum D_1 or D_2) – (Maximum D_5 or D_6)
R = (Maximum D_1, D_3 or D_5) – (Minimum D_2, D_4 or D_6)

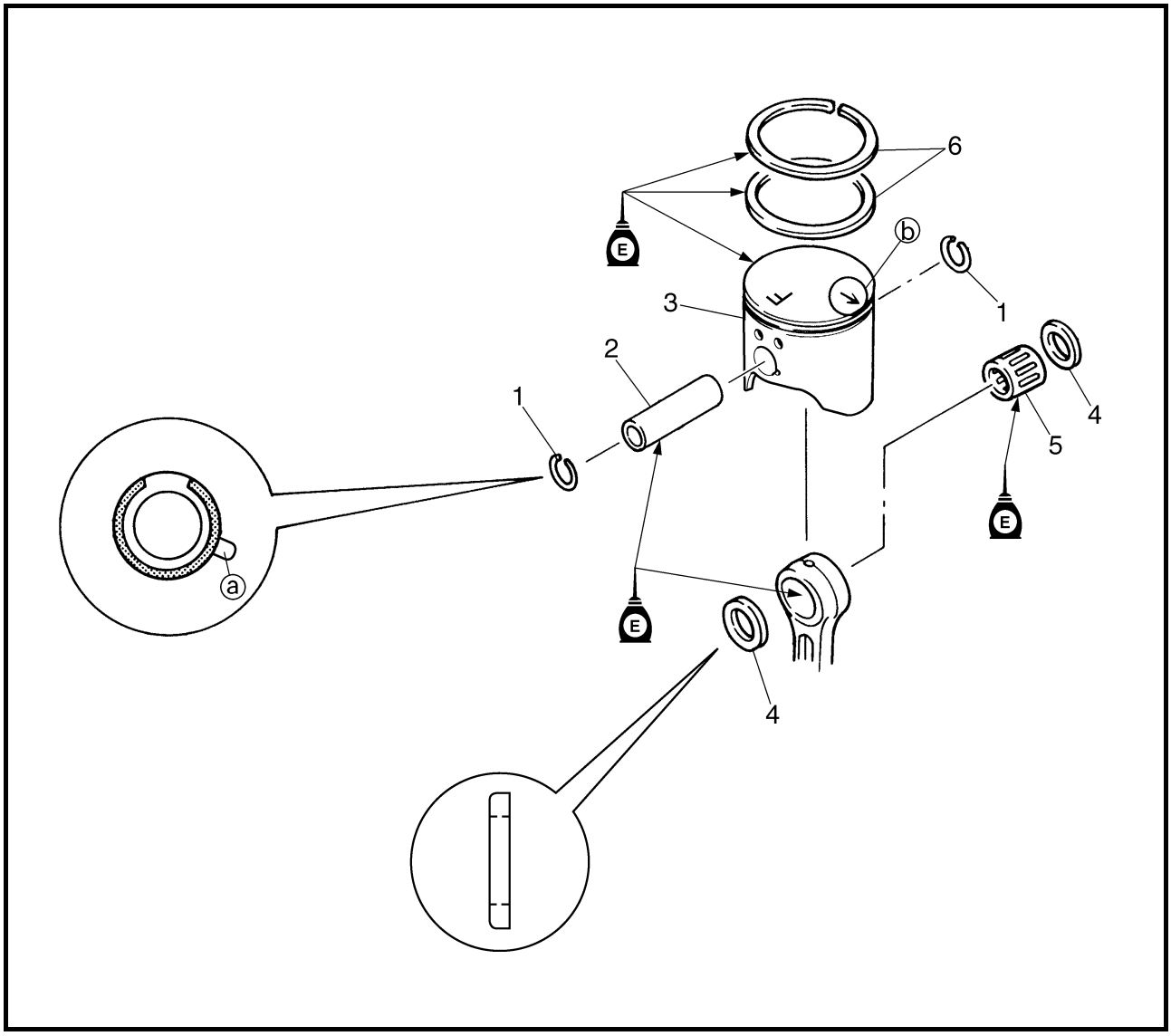
PISTONS
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	PISTON REMOVAL		Follow the left "Step" for removal.
	Cylinders		Refer to "CYLINDERS."
1	Piston pin clip	2	**Not reusable** **CAUTION:** **Do not align the open end of the clip with the piston pin slot ⓐ.**
2	Piston pin	1	
3	Piston	1	**NOTE:** Install the piston with the arrow ⓑ facing towards the exhaust port.
4	Washer	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
5	Bearing	1	
6	Piston ring	2	**CAUTION:** **Align each end gap with its respective locating pin.** Reverse the removal steps for installation.

SERVICE POINTS

Piston pin clip removal and installation

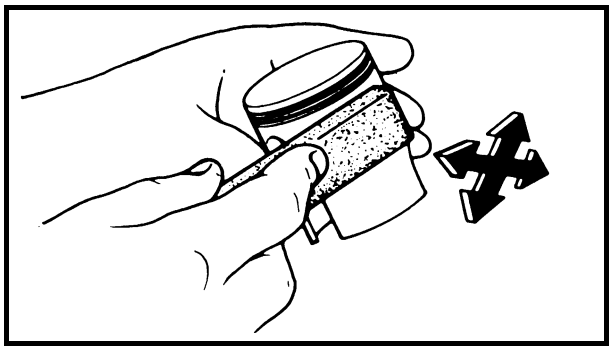
1. Remove and install:
   - Piston pin clip

NOTE:

Before removing or installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.

Piston inspection

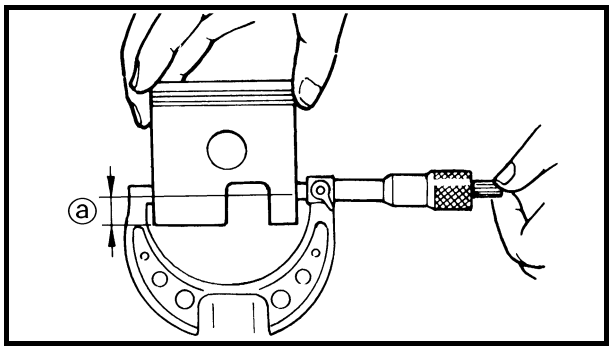
1. Eliminate:
   - Carbon deposits
     (from the piston crown and piston ring grooves)



2. Check:
   - Piston wall
     Score marks → Repair with 600–800 grit wet sandpaper or replace.

NOTE:

Lightly sand the piston wall in a crisscross pattern.



3. Measure:
   - Piston skirt diameter
     (using a micrometer)
     Out of specification → Replace.

Piston diameter	Distance ⓐ
83.899–83.914 mm (3.3031–3.3037 in)	11 mm (0.43 in)

4. Calculate:
   - Piston-to-cylinder clearance
     Out of specification → Replace the piston, piston rings, and cylinder as a set.

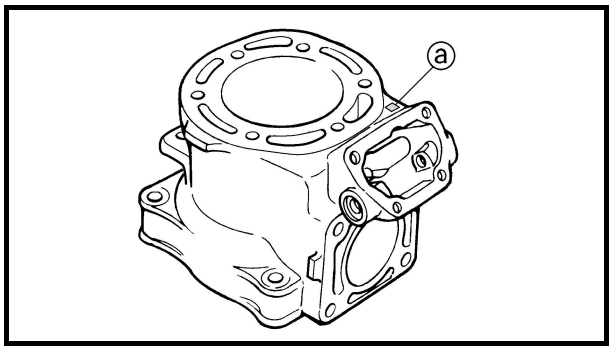
PISTON CLEARANCE	=	CYLINDER BORE	–	PISTON DIAMETER

Piston-to-cylinder clearance:
0.100–0.105 mm
(0.0039–0.0041 in)

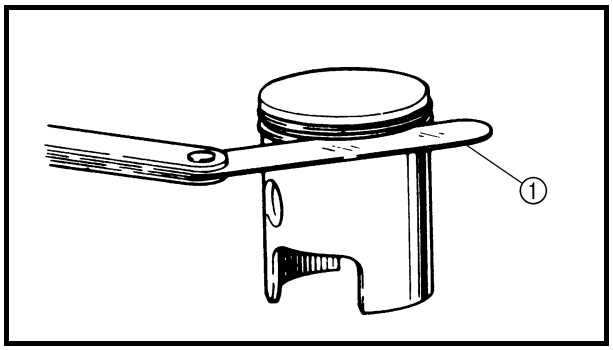
Cylinder and piston combination
Select the appropriate piston to match the cylinder size from the table as follows.

Cylinder size indication ⓐ	Piston color mark
00–05	Red
06–10	Orange
11–15	Green
16–18	Purple

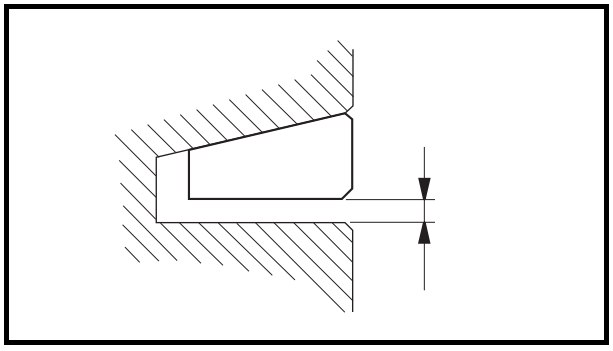
NOTE:
New cylinder bore size = 84.000 + ⓐ/1,000
Example: ⓐ = 12 → 84.012 mm.

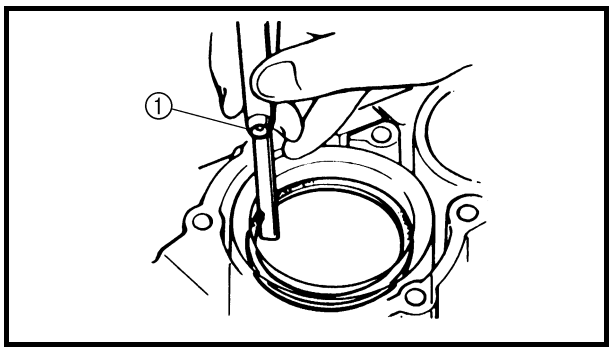


Piston ring inspection
1. Measure:
   - Side clearance
     (using a thickness gauge ①)
     Out of specification → Replace the piston and piston rings as a set.



Side clearance:
0.020–0.070 mm
(0.0008–0.0028 in)

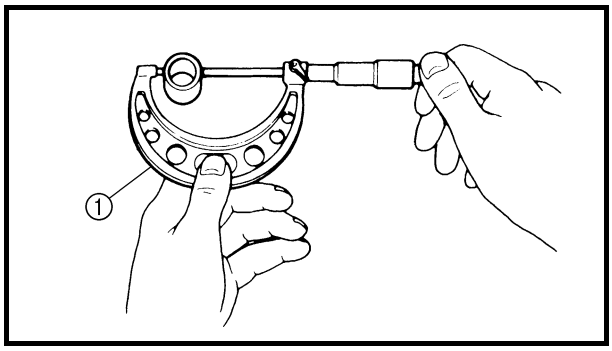




2. Measure:
   • End gap
   (using a thickness gauge ①)
   Out of specification → Replace the piston rings as a set.

End gap:
0.45–0.60 mm (0.018–0.024 in)

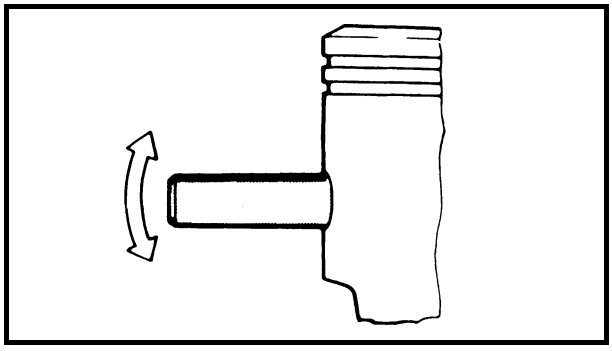
NOTE:
Push the piston ring into the cylinder with the piston crown.



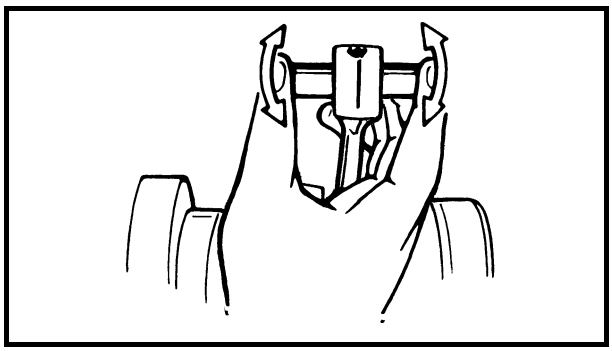
Piston pin and bearing inspection

1. Check:
   • Piston pins
   • Bearings
   Signs of heat discoloration → Replace.
2. Measure:
   • Piston pin outside diameter
   (using a micrometer ①)
   Out of specification → Replace.

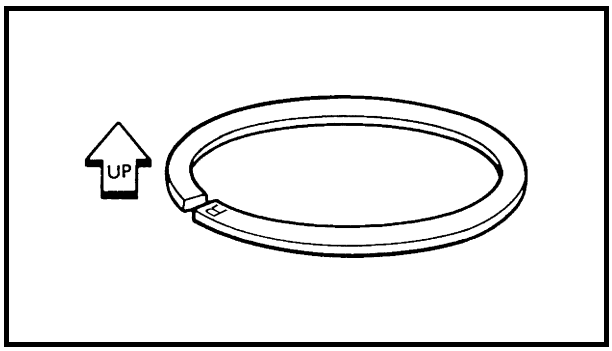
Piston pin outside diameter:
Standard:
21.995–22.000 mm
(0.8659–0.8661 in)
Limit:
21.990 mm (0.8657 in)



3. Check:
   • Piston-pin-to-piston free play
   (with the piston pin in the piston as shown)
   Free play → Replace the piston pin, piston, or both.



4. Check:
   - Piston-pin-to-small-end-bearing-to-connecting-rod free play
     (at the small end of the connecting rod as shown)
     Free play/wear at the small end → Replace the piston pin, connecting rod, small end bearing, or all parts.



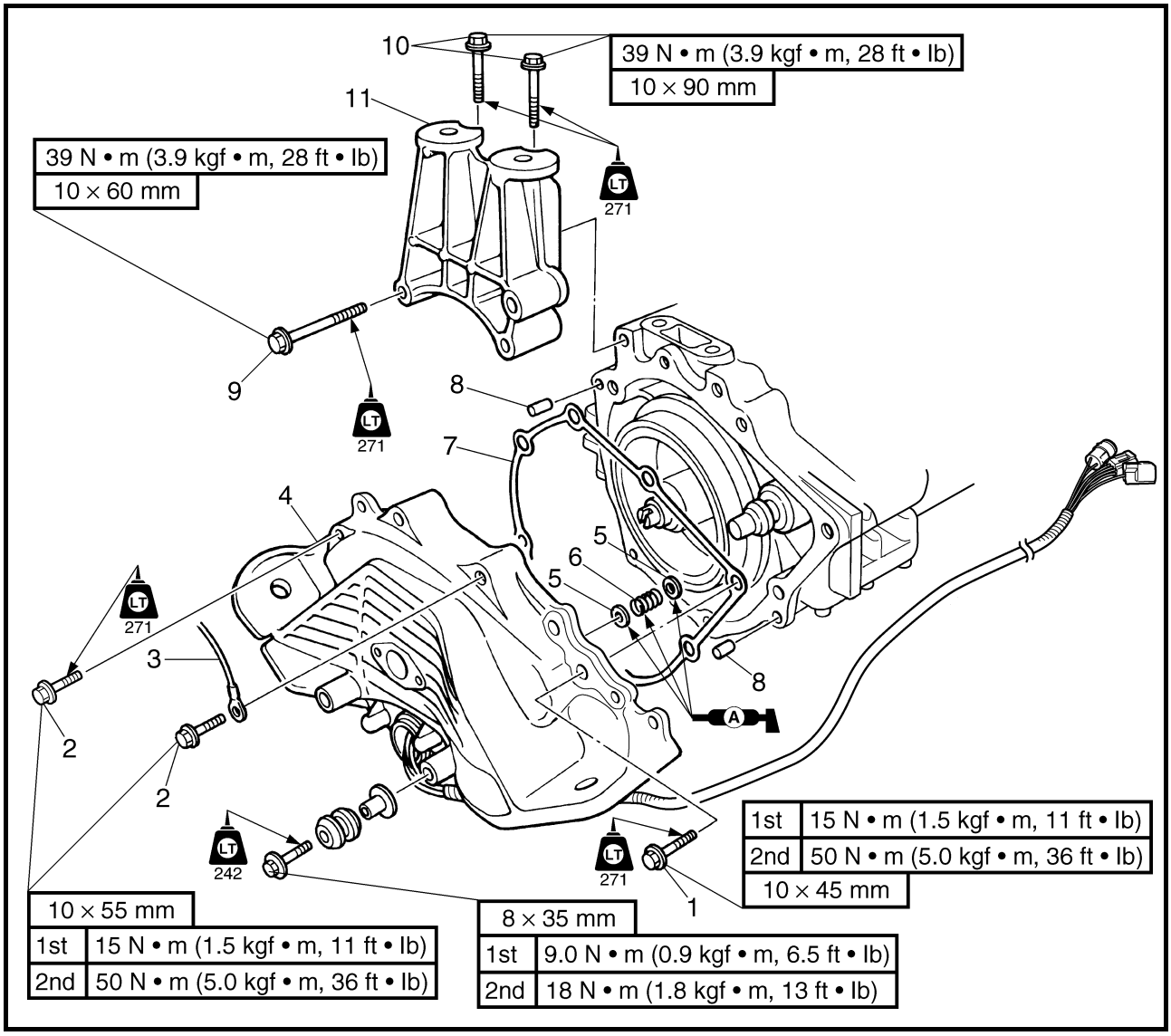
Piston installation

1. Install:
   - Top ring
   - 2nd ring

NOTE:
Install the piston rings with the manufacturer's marks or numbers facing up.

GENERATOR AND STARTER MOTOR

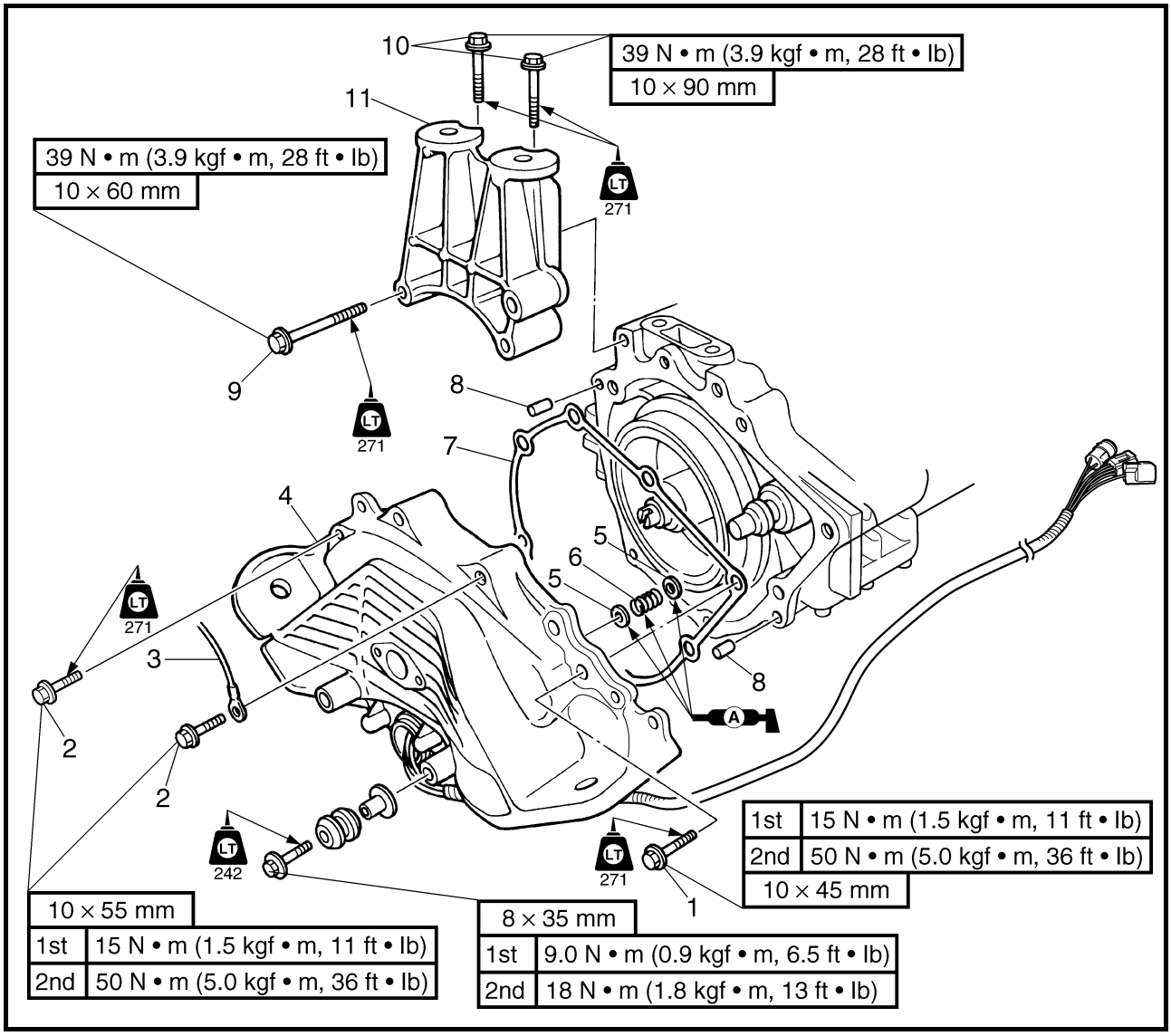
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

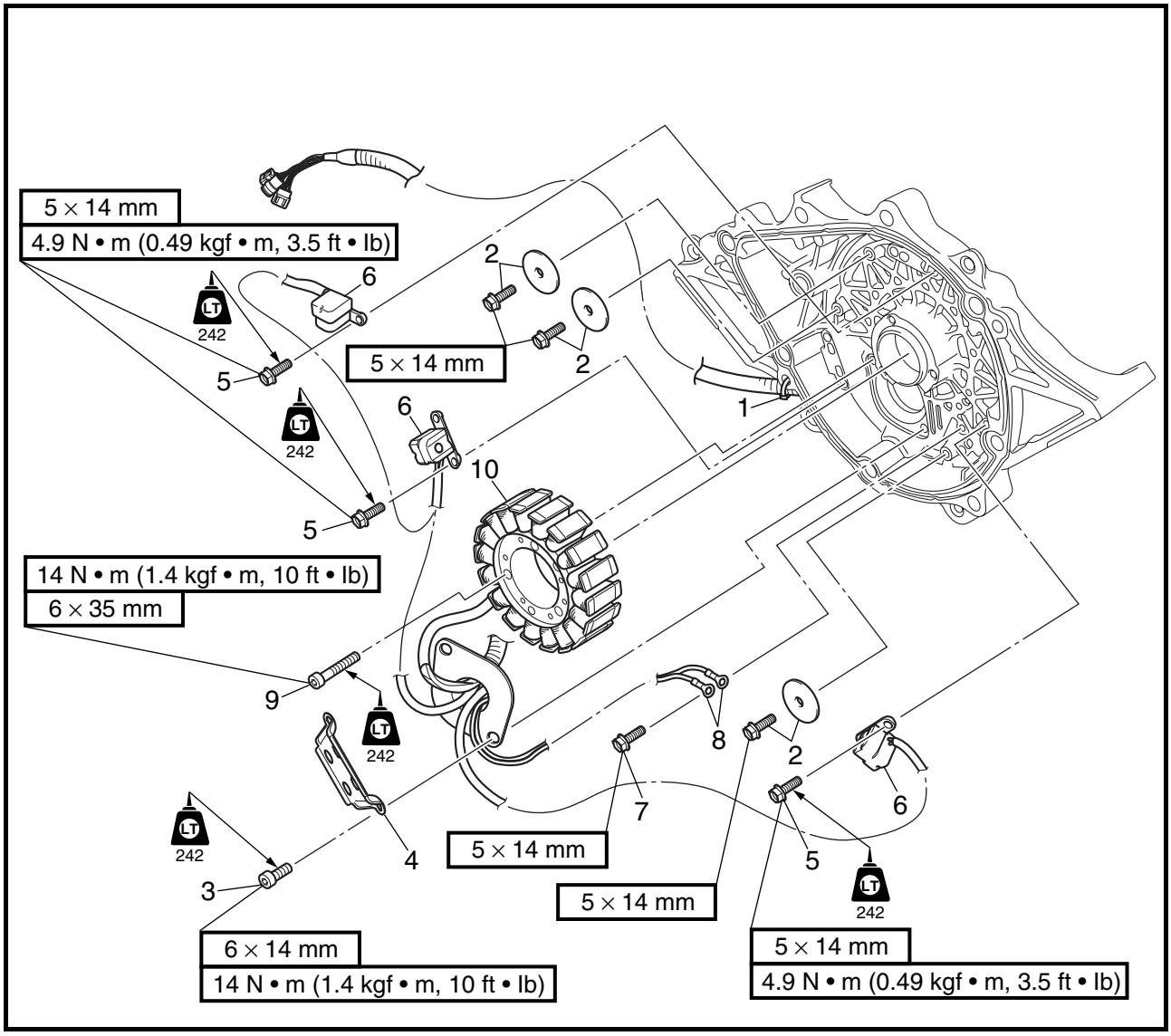
Step	Procedure/Part name	Q'ty	Service points
	GENERATOR COVER REMOVAL		Follow the left "Step" for removal.
	Oil pump		Refer to "OIL PUMP" in Chapter 4.
1	Bolt	1	
2	Bolt	7	**NOTE:** Do not apply locking agent to the bolt that is used to install the ground lead.
3	Ground lead	1	
4	Generator cover	1	
5	Washer	2	
6	Spring	1	
7	Seal	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
8	Pin	2	
9	Bolt	2	
10	Bolt	2	
11	Exhaust chamber bracket	1	
			Reverse the removal steps for installation.

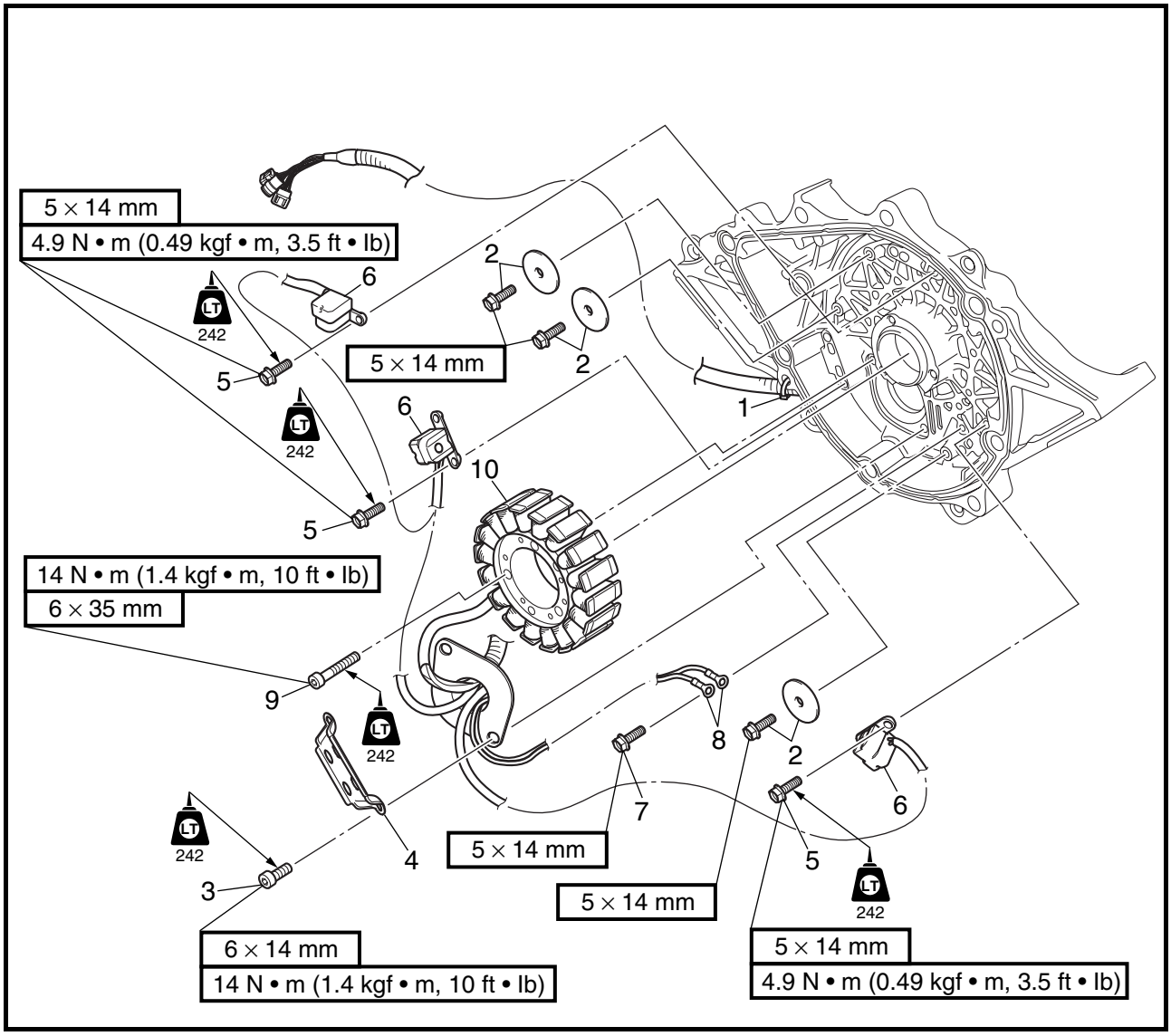
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

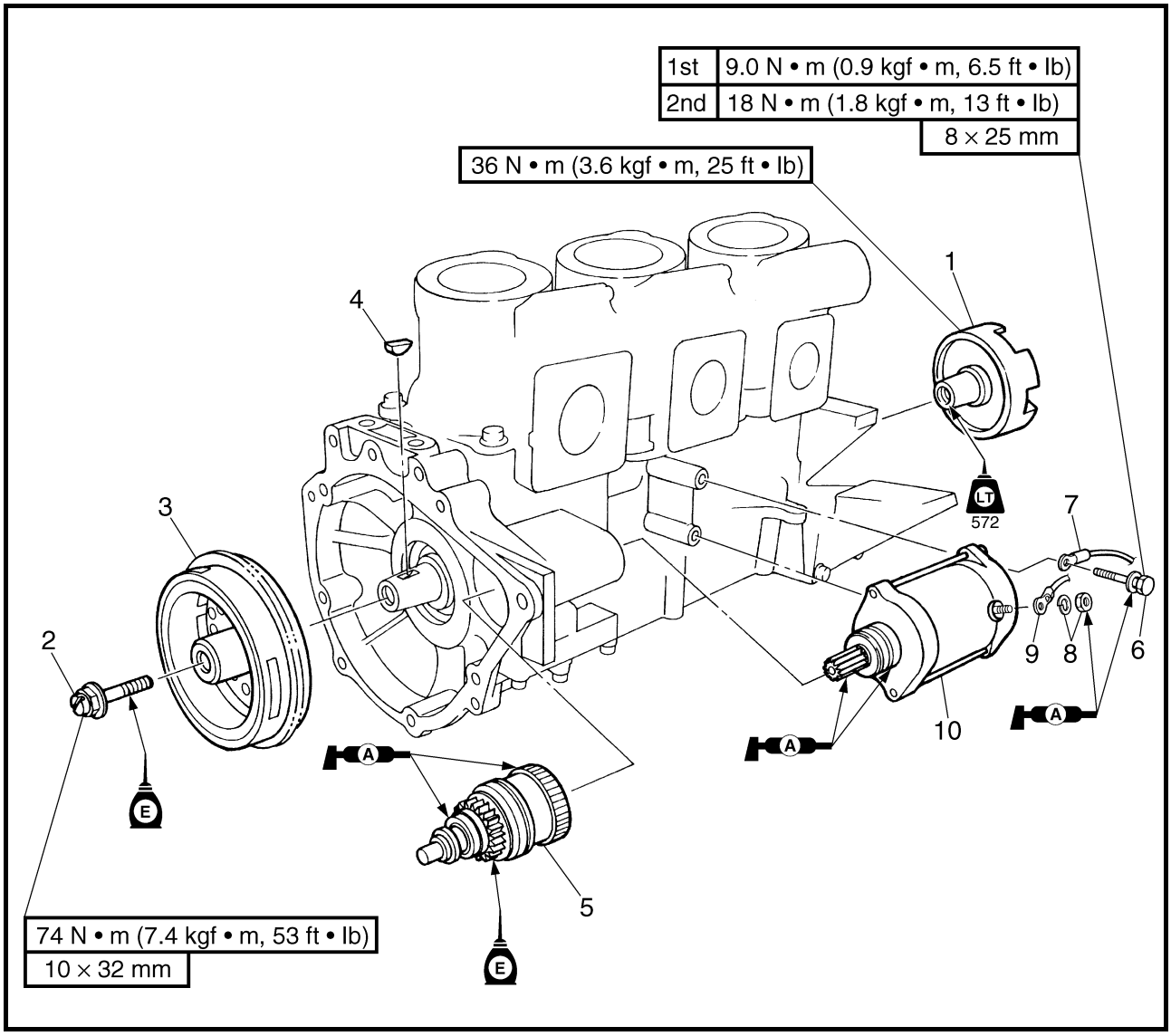
Step	Procedure/Part name	Q'ty	Service points
	STATOR COIL AND PICKUP COIL REMOVAL		Follow the left "Step" for removal.
1	Plastic tie	1	**Not reusable**
2	Bolt/washer	3/3	**NOTE:** These washers hold the pickup coil leads. Be sure not to pinch the leads between the projections and the washers when installing the bolts.
3	Bolt	2	
4	Cable holder	1	
5	Bolt	6	
6	Pickup coil	3	
7	Bolt	1	

EXPLODED DIAGRAM


5 × 14 mm
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)
242
5 × 14 mm
14 N • m (1.4 kgf • m, 10 ft • lb)
6 × 35 mm
6 × 14 mm
14 N • m (1.4 kgf • m, 10 ft • lb)
5 × 14 mm
5 × 14 mm
5 × 14 mm
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)

Step	Procedure/Part name	Q'ty	Service points
8	Ground lead	2	
9	Bolt	3	
10	Lighting coil	1	
			Reverse the removal steps for installation.

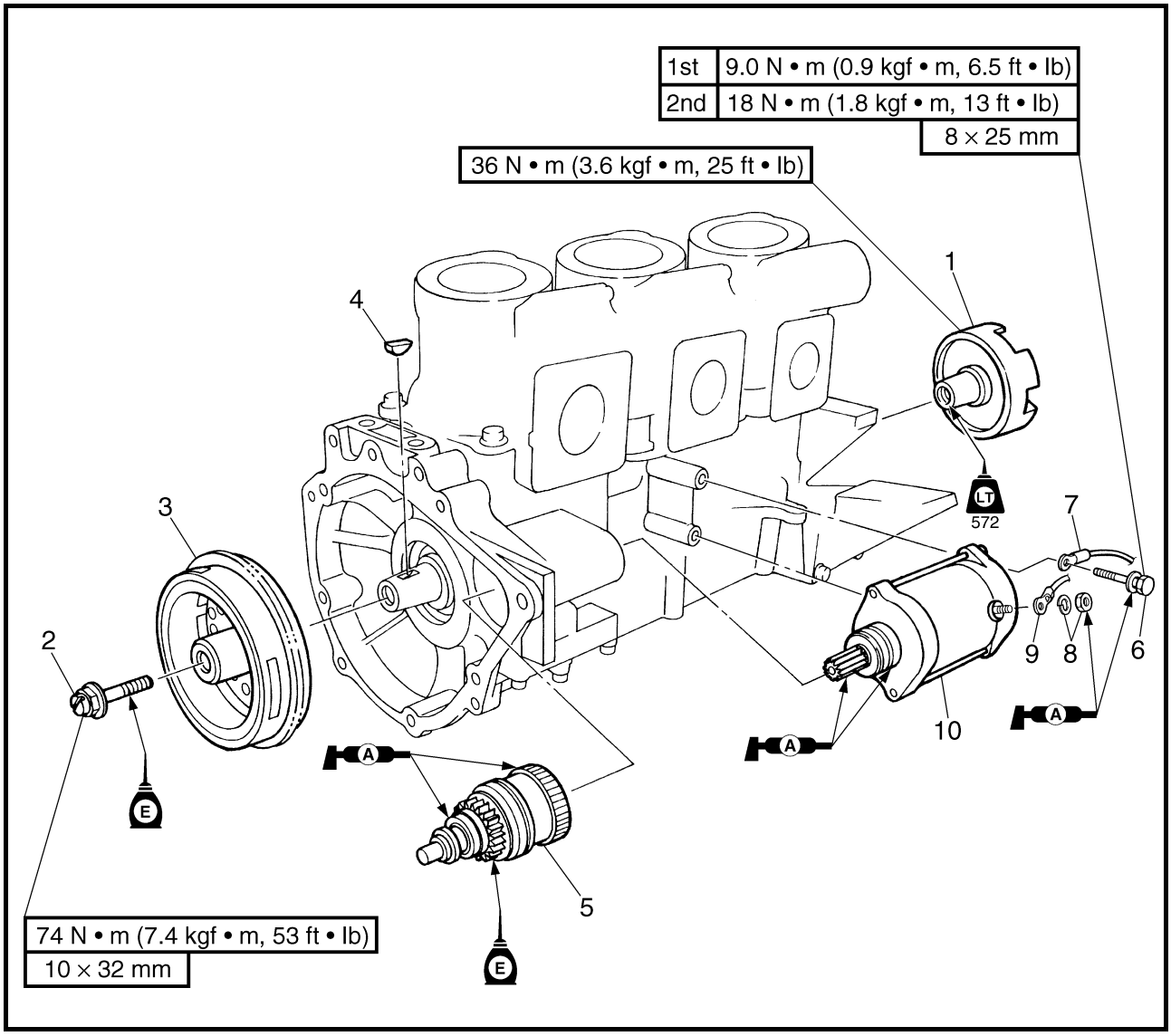
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

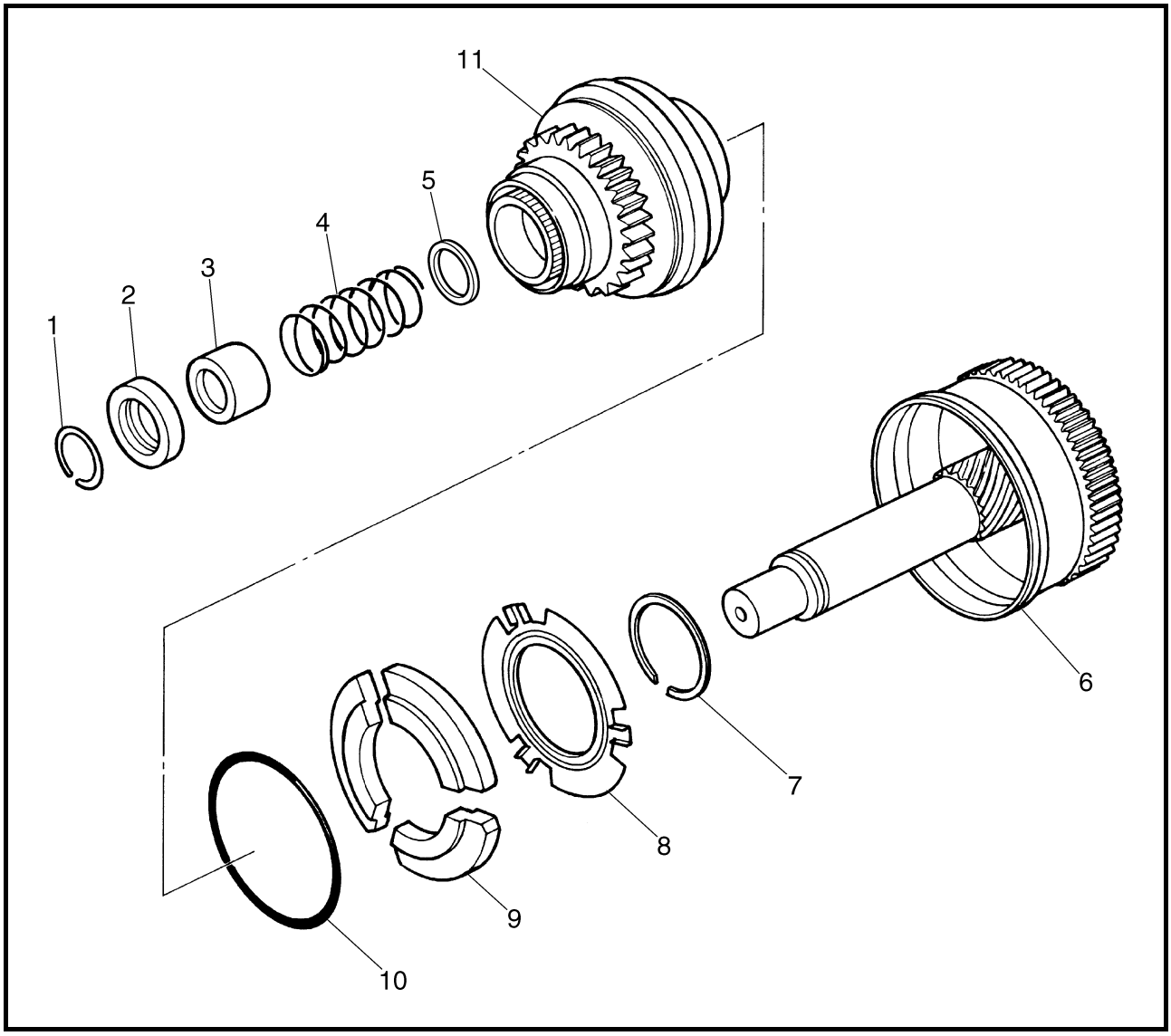
Step	Procedure/Part name	Q'ty	Service points
	GENERATOR ROTOR AND STARTER MOTOR REMOVAL		Follow the left "Step" for removal.
1	Drive coupling	1	
2	Flywheel magneto bolt	1	
3	Flywheel magneto	1	**NOTE:** Degrease the flywheel magneto where it is coupled to the crankshaft.
4	Woodruff key	1	
5	Starter clutch assembly	1	
6	Bolt	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Negative battery lead	1	
8	Nut/washer	1/1	
9	Starter motor lead	1	
10	Starter motor	1	
			Reverse the removal steps for installation.

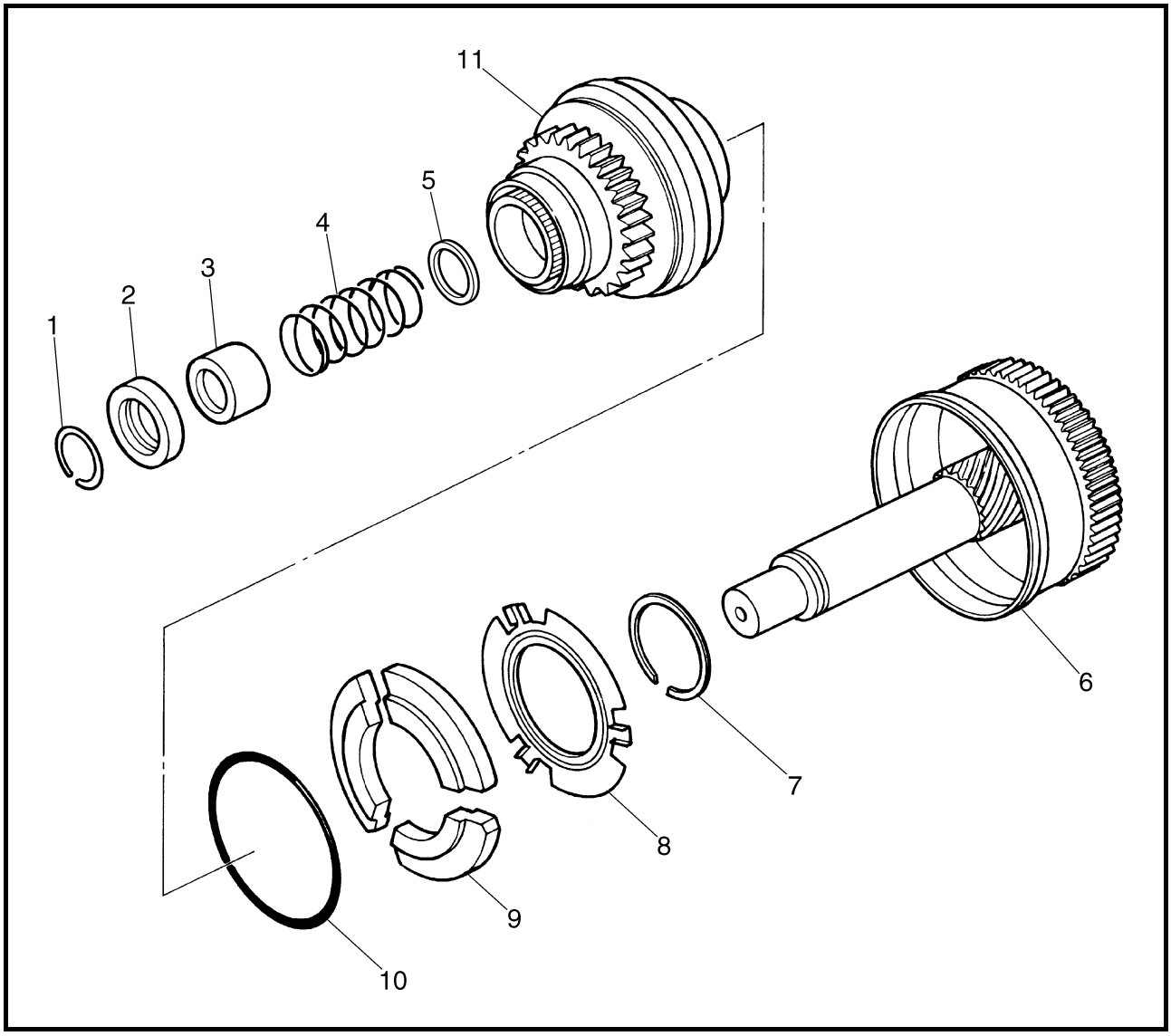
EXPLODED DIAGRAM



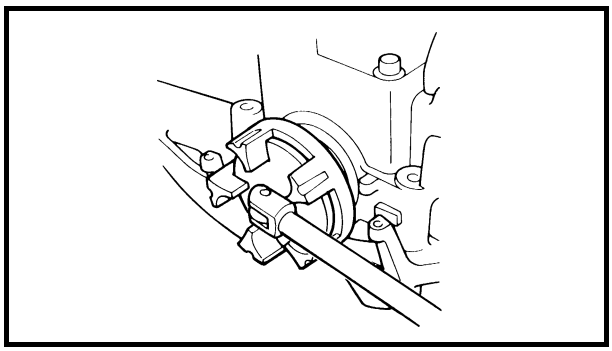
REMOVAL AND INSTALLATION CHART

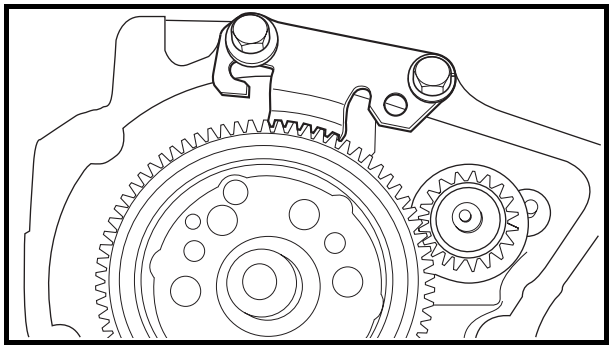
Step	Procedure/Part name	Q'ty	Service points
	STARTER CLUTCH DISASSEMBLY		Follow the left "Step" for disassembly.
1	Clip	1	**Not reusable**
2	Clip stopper	1	
3	Spring seat	1	
4	Spring	1	
5	Washer	1	
6	Idle gear	1	
7	Circlip	1	
8	Plate	1	

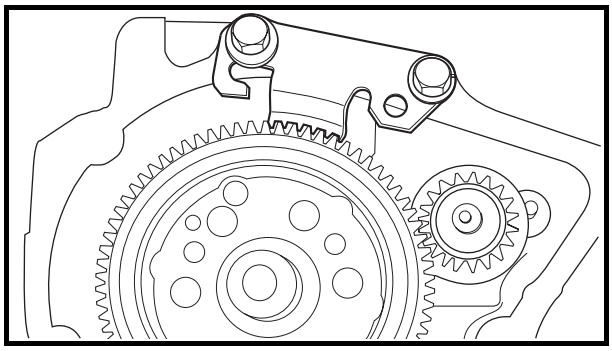
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Weight	3	
10	Spring ring	1	**NOTE:** Install the spring ring after installing the weights, plate, and circlip.
11	Pinion gear	1	Reverse the disassembly steps for assembly.



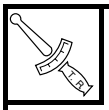




SERVICE POINTS

Drive coupling removal and installation

1. Remove:
   - Drive coupling

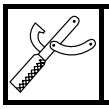
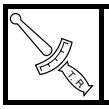
	Coupler wrench: **YW-06551/90890-06551** **Flywheel holder:** **YW-06550/90890-06550**
	**Drive coupling:** **36 N • m (3.6 kgf • m, 25 ft • lb)** **LOCTITE 572**

NOTE:

Install the drive coupling with the same special service tools that were used for removal.

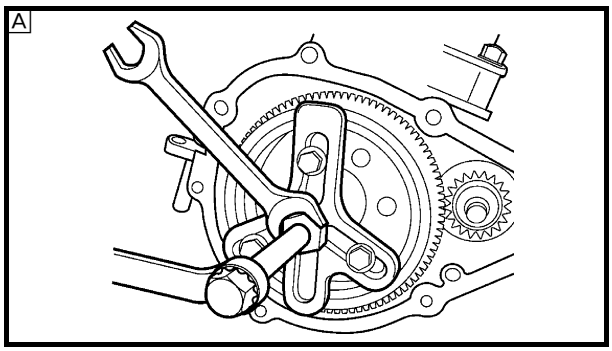
Flywheel magneto removal and installation

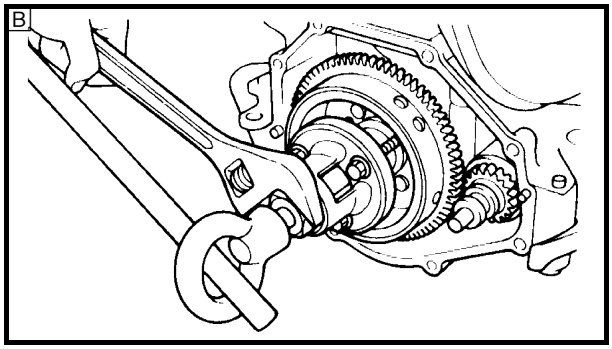
1. Remove:
   - Flywheel magneto bolt

	**Flywheel holder:** **YW-06550/90890-06550**
	**Flywheel magneto bolt:** **74 N • m (7.4 kgf • m, 53 ft • lb)**

NOTE:

Install the bolt with the same special service tool that was used for removal.





2. Remove:
   - Generator rotor

Universal puller:
YB-06117
Flywheel puller:
90890-06521
Set bolt:
M8 × 60 mm

A For USA and Canada
B For Worldwide

CAUTION:

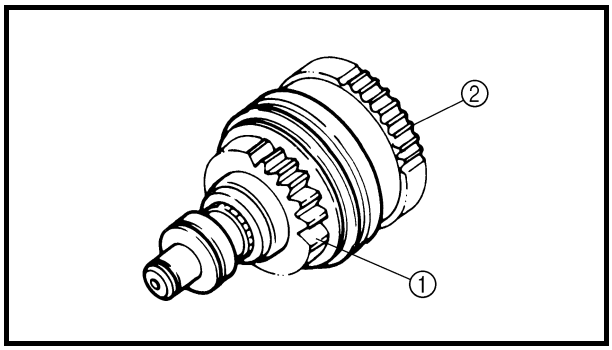
To prevent damage to the engine or special service tools, screw in the flywheel puller set bolts evenly and completely so that the puller plate is parallel to the generator rotor.

Drive coupling inspection

1. Check:
   - Drive coupling
     Damage/wear → Replace.

Flywheel magneto inspection

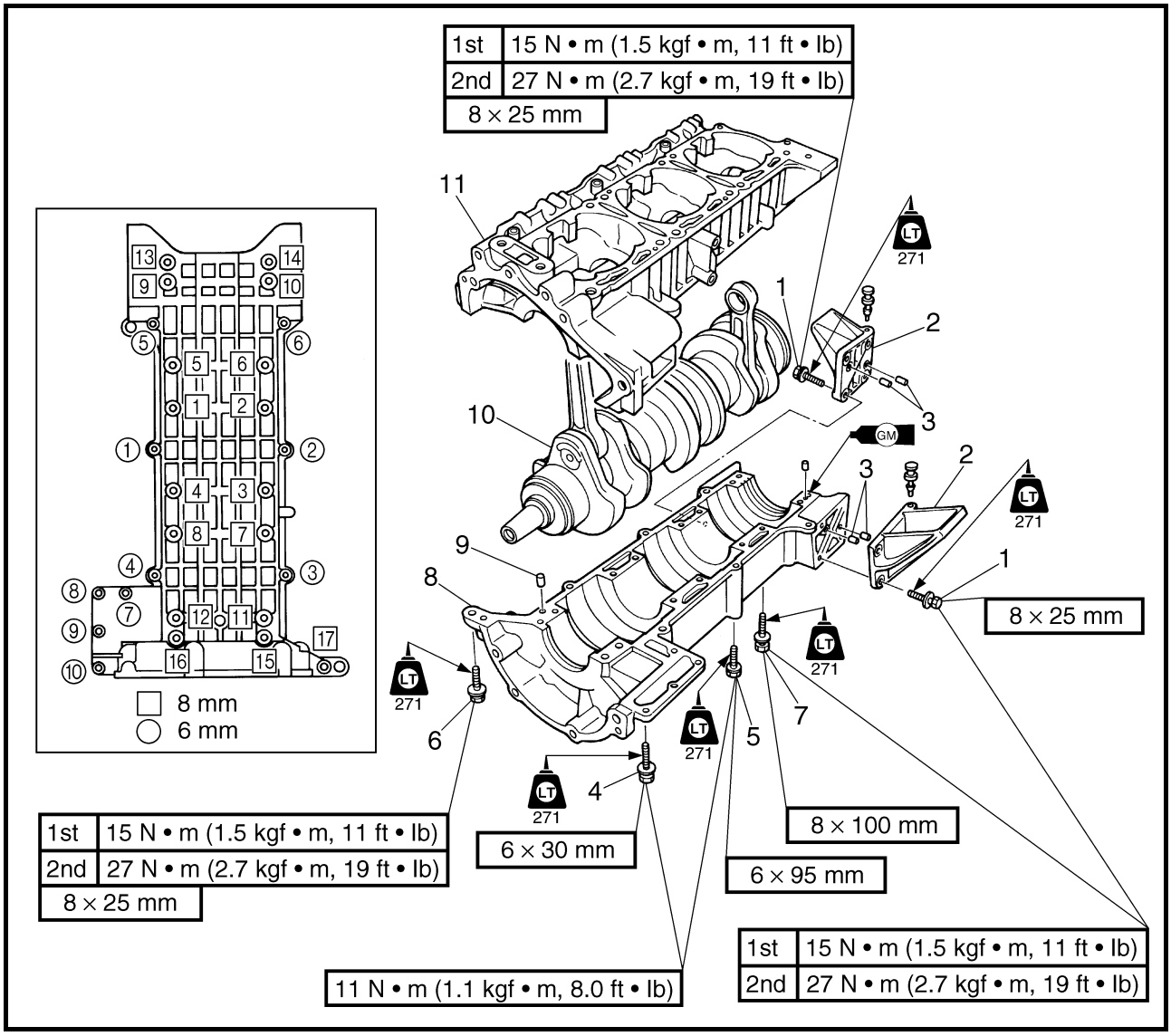
1. Check:
   - Ring gear
     Damage/wear → Replace.



Starter clutch assembly inspection

1. Check:
   - Pinion gear ①
   - Idle gear ②
     Damage/wear → Replace.
2. Check:
   - Gear movement
     Rough movement → Replace the defective part(s).

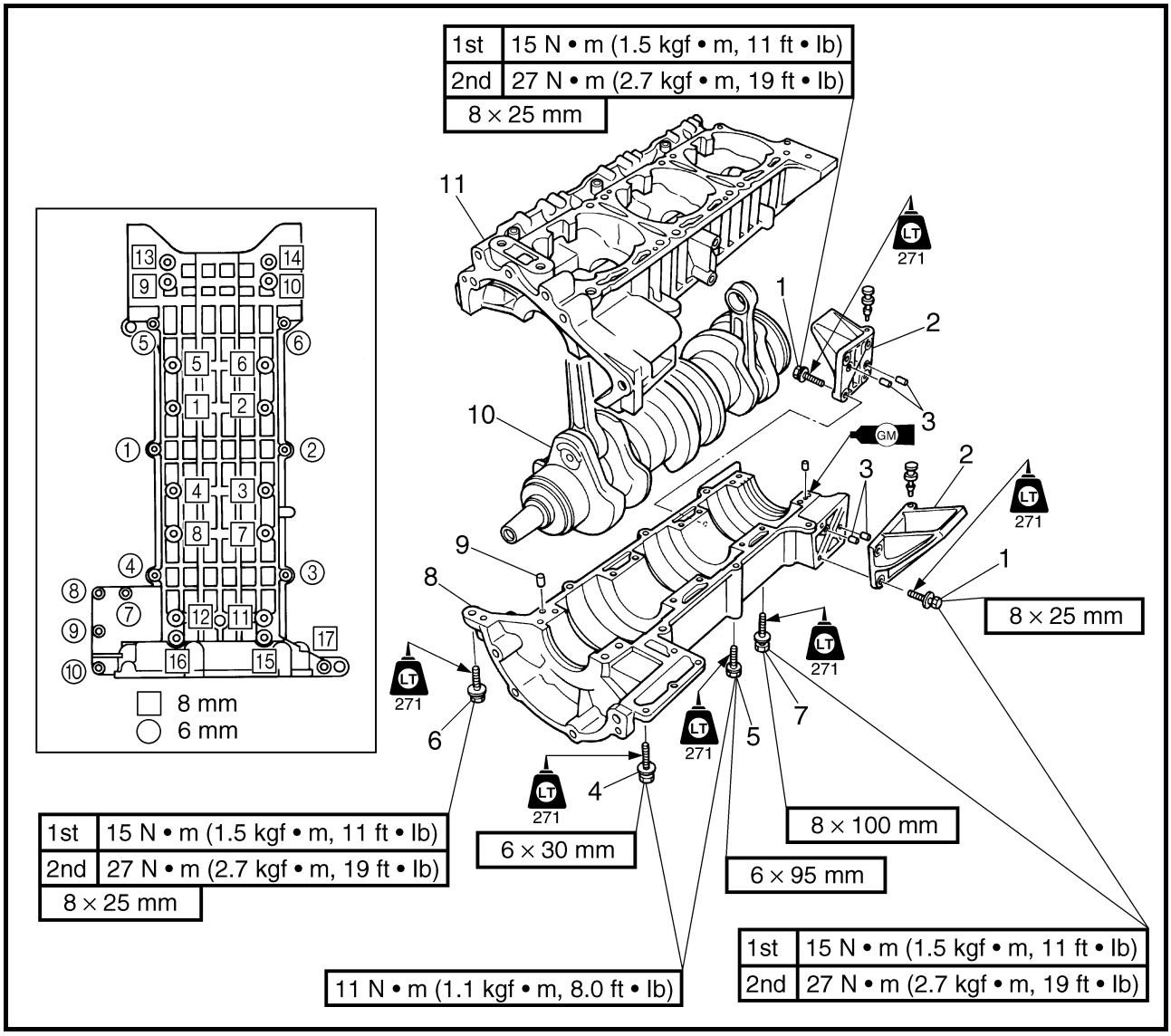
CRANKCASE
EXPLODED DIAGRAM


1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 27 N • m (2.7 kgf • m, 19 ft • lb)
8 × 25 mm
8 mm
6 mm
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 27 N • m (2.7 kgf • m, 19 ft • lb)
8 × 25 mm
6 × 30 mm
8 × 100 mm
6 × 95 mm
11 N • m (1.1 kgf • m, 8.0 ft • lb)
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 27 N • m (2.7 kgf • m, 19 ft • lb)
8 × 25 mm
271
GM

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CRANKCASE DISASSEMBLY		Follow the left "Step" for disassembly.
	Pistons		Refer to "PISTONS."
	Generator cover and starter motor		Refer to "GENERATOR AND STARTER MOTOR."
1	Bolt	6	
2	Mount bracket	2	
3	Pin	4	
4	Bolt	4	**NOTE:** Tighten the bolts in the sequences shown and in two stages if specified.
5	Bolt	6	
6	Bolt	1	
7	Bolt	16	

EXPLODED DIAGRAM

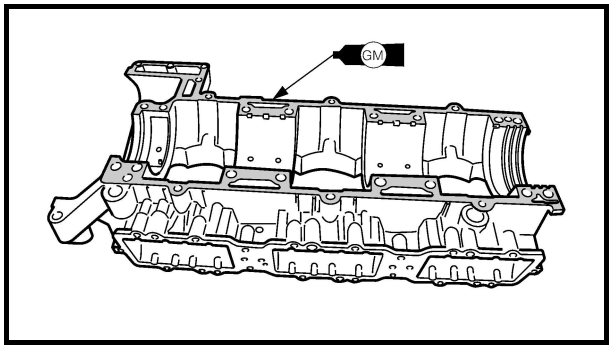

1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 27 N • m (2.7 kgf • m, 19 ft • lb)
8 × 25 mm
8 mm
6 mm
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 27 N • m (2.7 kgf • m, 19 ft • lb)
8 × 25 mm
6 × 30 mm
8 × 100 mm
6 × 95 mm
11 N • m (1.1 kgf • m, 8.0 ft • lb)
1st 15 N • m (1.5 kgf • m, 11 ft • lb)
2nd 27 N • m (2.7 kgf • m, 19 ft • lb)
8 × 25 mm
271
GM

Step	Procedure/Part name	Q'ty	Service points
8	Lower crankcase	1	
9	Pin	2	
10	Crankshaft assembly	1	
11	Upper crankcase	1	
			Reverse the disassembly steps for assembly.

SERVICE POINTS

Crankcase inspection

1. Check:
   - Mating surfaces
     Scratches → Replace the crankcase.
   - Crankcase
     Cracks/damage → Replace.



Crankcase installation

1. Apply:
   - Gasket Maker
     (to the crankcase mating surfaces)

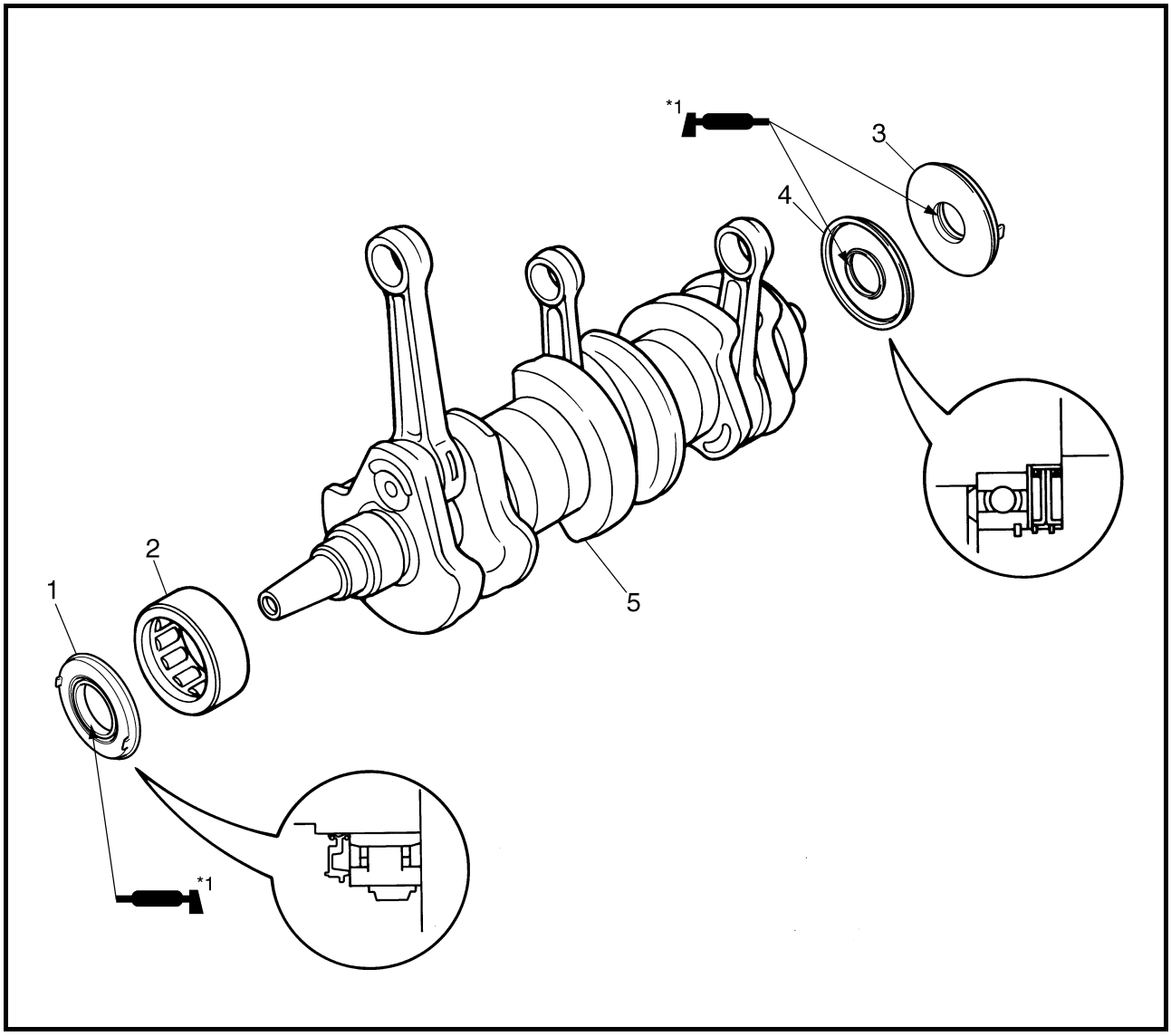
NOTE:
Before applying Gasket Maker, clean the crankcase mating surfaces.

2. Check:
   - Crankshaft
     Rough movement → Recheck.

NOTE:
Make sure that the crankshaft rotates smoothly after installing it.

CRANKSHAFT

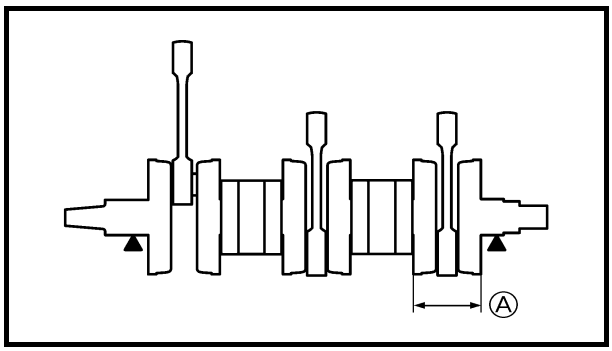
EXPLODED DIAGRAM

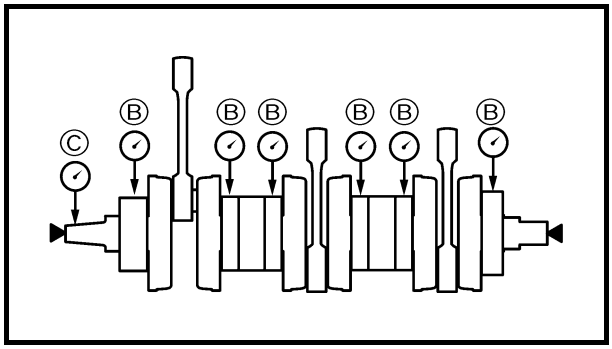


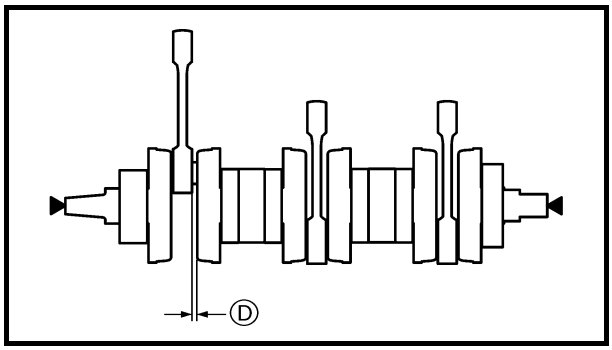
REMOVAL AND INSTALLATION CHART

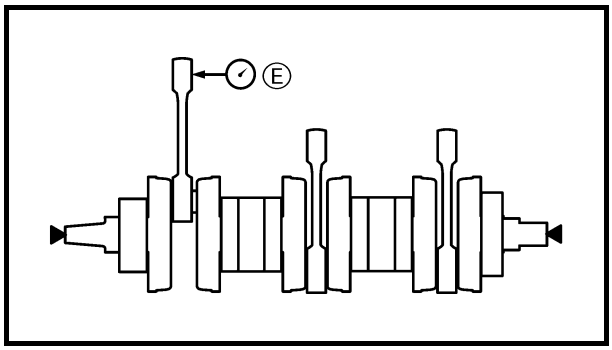
Step	Procedure/Part name	Q'ty	Service points
	CRANKSHAFT REMOVAL		Follow the left "Step" for removal.
	Crankcase		Refer to "CRANKCASE."
1	Oil seal	1	**Not reusable**
2	Bearing	1	
3	Oil seal 1	1	**Not reusable**
4	Oil seal 2	1	**Not reusable**
5	Crankshaft assembly	1	**CAUTION:** **Install the bearing locating pins into the grooves in the crankcase body.**
			Reverse the removal steps for installation.

*1 EPNOC grease AP #0









SERVICE POINTS

Crankshaft inspection

1. Measure:
   - Crank width Ⓐ
     Out of specification → Replace the crankshaft.

Crank width:
72.95–73.00 mm (2.872–2.874 in)

2. Measure:
   - Deflection Ⓑ
     (using a dial gauge)
     Out of specification → Replace.

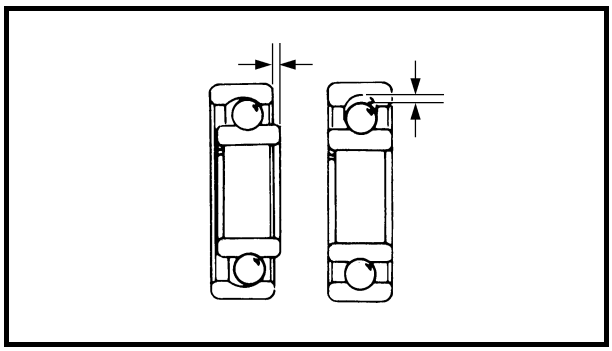
Maximum deflection:
Ⓑ 0.05 mm (0.002 in)
Ⓒ 0.15 mm (0.006 in)

3. Measure:
   - Big end side clearance Ⓓ
     (using a thickness gauge)
     Out of specification → Replace.

Big end side clearance:
0.250–0.750 mm
(0.0098–0.0295 in)

4. Measure:
   - Small end free play Ⓔ
     (using a dial gauge)
     Out of specification → Replace.

Small end free play limit:
2.000 mm (0.0787 in)



5. Check:
   • Bearings
     Damage/pitting → Replace.

NOTE:
- Before checking bearings, thoroughly clean them.
- Immediately after checking the bearings, lubricate them to prevent rust.

6. Check:
   • Oil seals
     Damage/wear → Replace.

CHAPTER 6
JET PUMP UNIT

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REMOVAL AND INSTALLATION CHART 6-1

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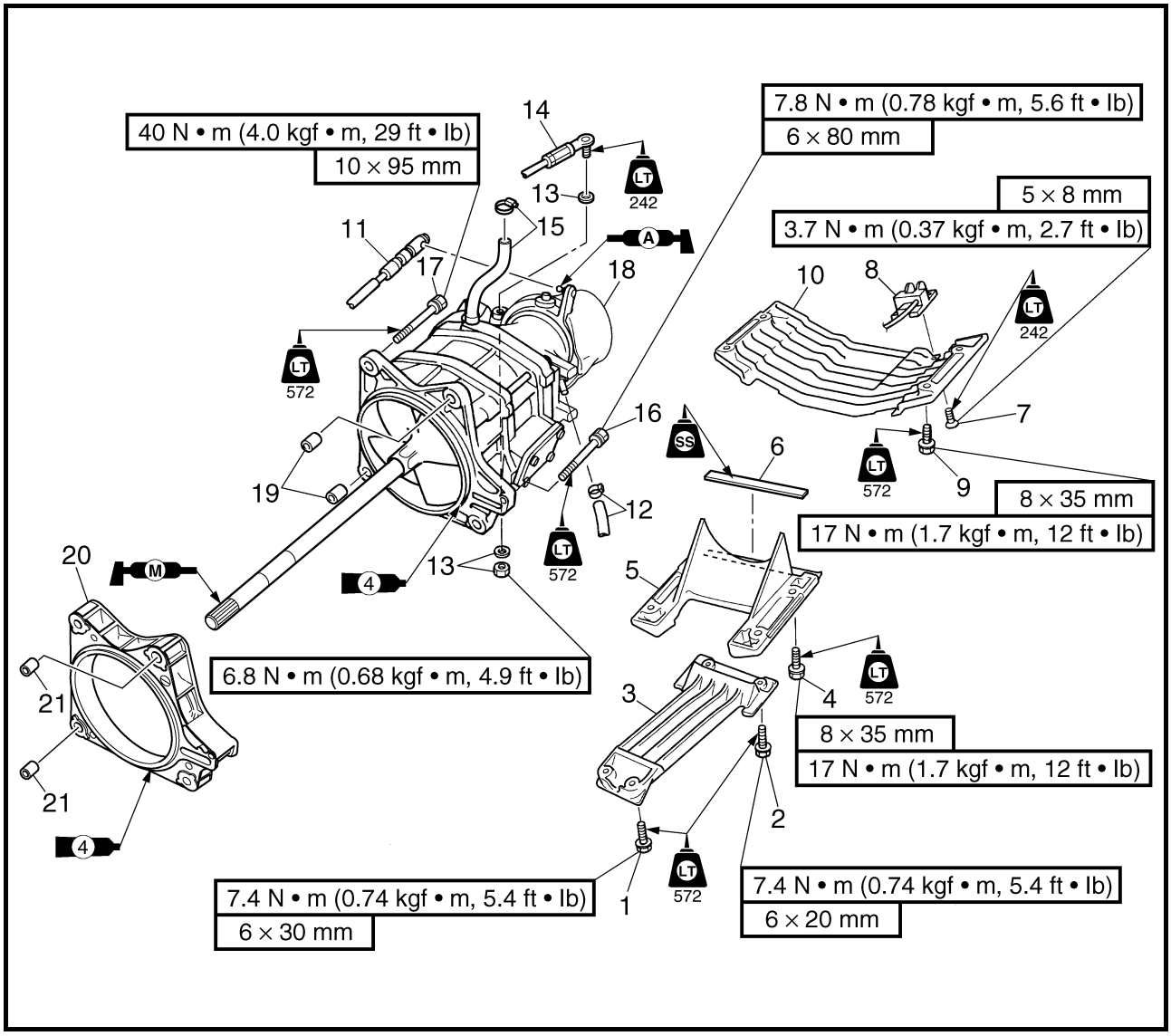
JET PUMP UNIT

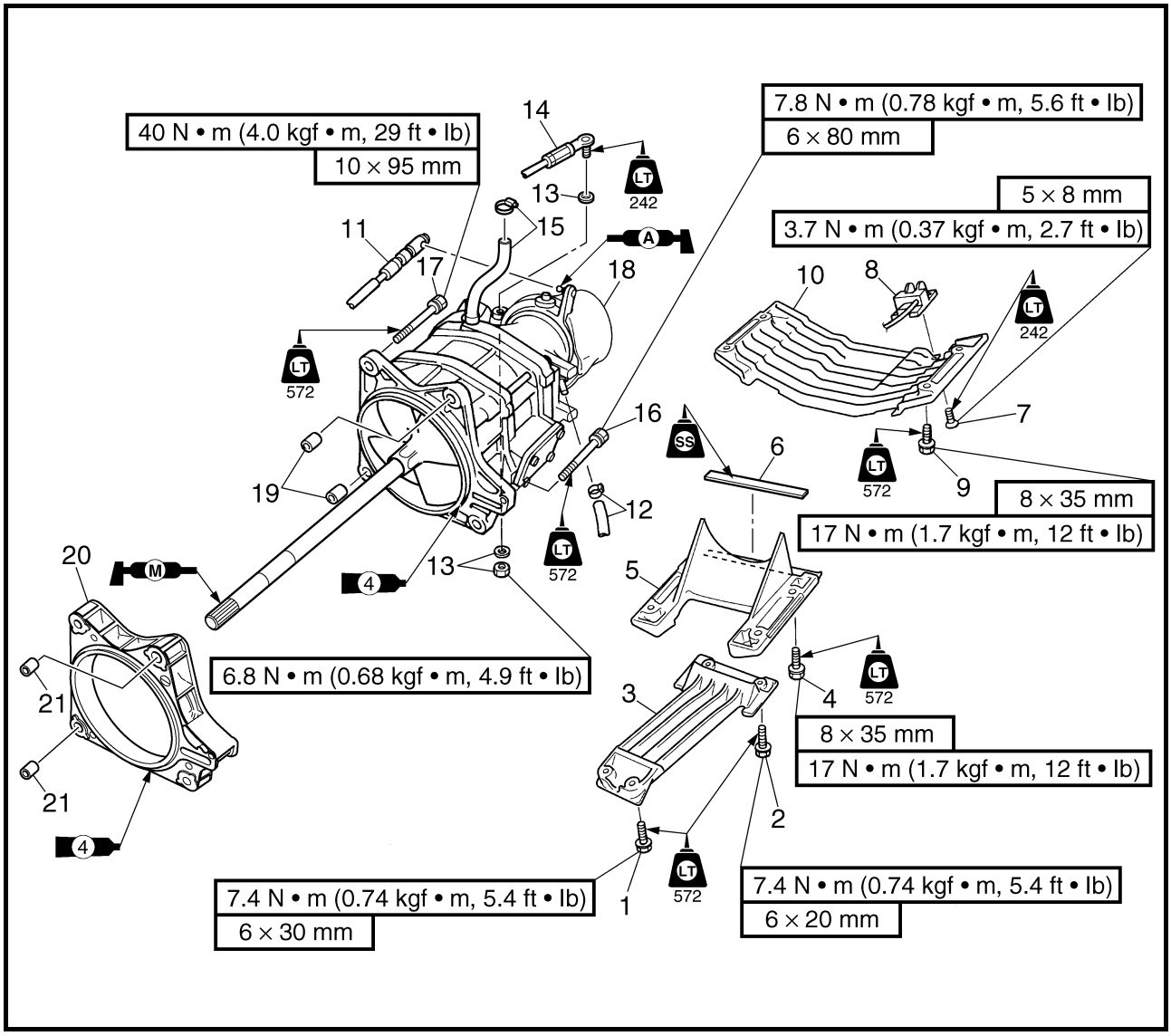
EXPLODED DIAGRAM


40 N • m (4.0 kgf • m, 29 ft • lb)
10 × 95 mm
7.8 N • m (0.78 kgf • m, 5.6 ft • lb)
6 × 80 mm
5 × 8 mm
3.7 N • m (0.37 kgf • m, 2.7 ft • lb)
8 × 35 mm
17 N • m (1.7 kgf • m, 12 ft • lb)
6.8 N • m (0.68 kgf • m, 4.9 ft • lb)
8 × 35 mm
17 N • m (1.7 kgf • m, 12 ft • lb)
7.4 N • m (0.74 kgf • m, 5.4 ft • lb)
6 × 30 mm
7.4 N • m (0.74 kgf • m, 5.4 ft • lb)
6 × 20 mm
LT 242
LT 572
SS
A
M
4

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	JET PUMP UNIT REMOVAL		Follow the left "Step" for removal.
1	Bolt	2	
2	Bolt	2	
3	Intake grate	1	
4	Bolt	4	
5	Intake duct	1	
6	Felt seal	1	
7	Screw	4	
8	Speed sensor	1	**NOTE:** Route the speed sensor lead between the jet pump unit and bilge hose 5.

EXPLODED DIAGRAM


40 N • m (4.0 kgf • m, 29 ft • lb)
10 × 95 mm
7.8 N • m (0.78 kgf • m, 5.6 ft • lb)
6 × 80 mm
5 × 8 mm
3.7 N • m (0.37 kgf • m, 2.7 ft • lb)
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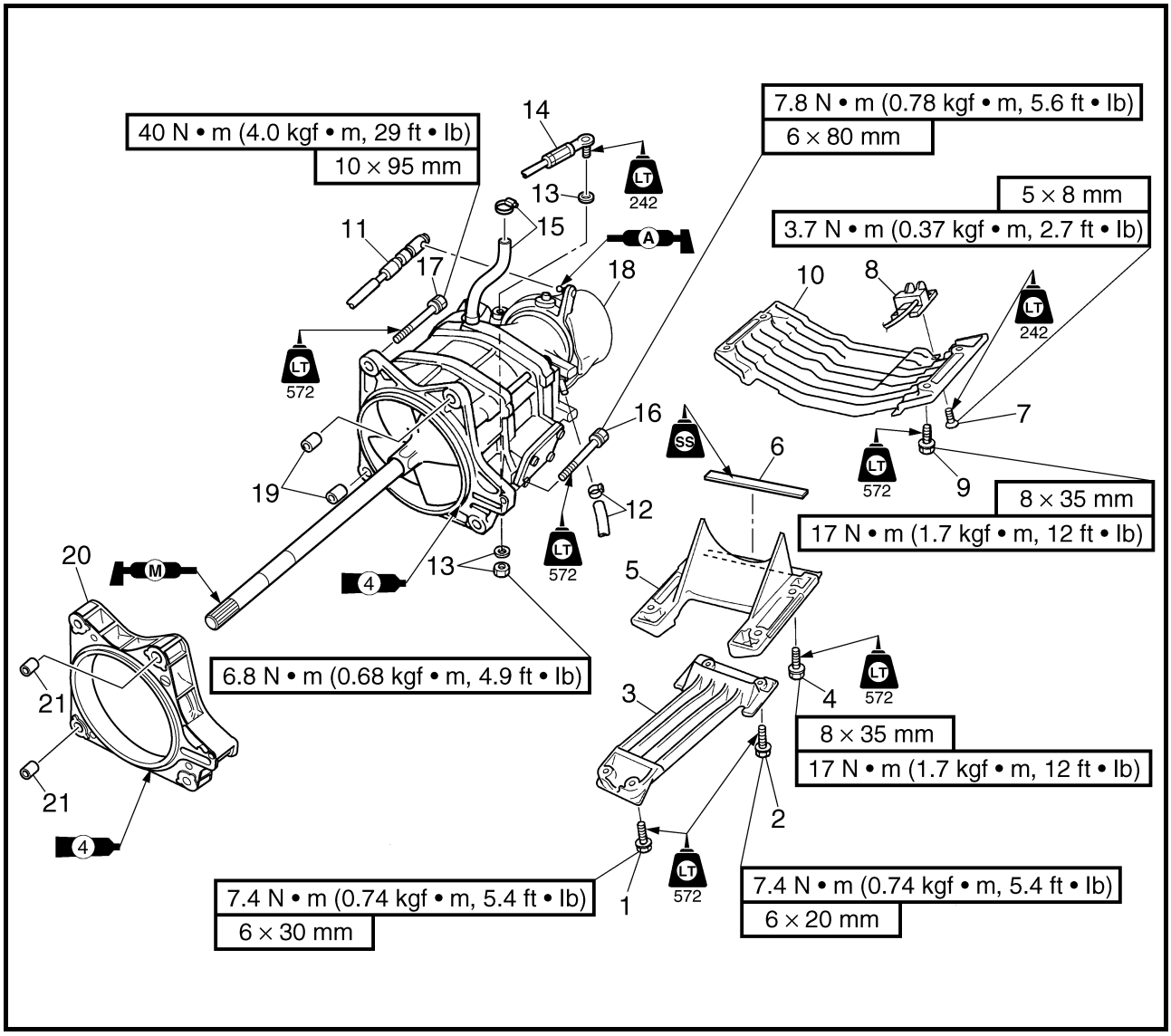
6 × 30 mm
7.4 N • m (0.74 kgf • m, 5.4 ft • lb)
6 × 20 mm
LT 242
LT 572
SS
A
M
4

Step	Procedure/Part name	Q'ty	Service points
9	Bolt	4	
10	Ride plate	1	
11	QSTS cable joint	1	
12	Plastic tie/bilge hose 5	1/1	
13	Nut/washer	1/2	
14	Steering cable joint	1	
15	Screw clamp/spout hose	1/1	
16	Bolt	1	
17	Bolt	4	

EXPLODED DIAGRAM


40 N • m (4.0 kgf • m, 29 ft • lb)
10 × 95 mm
7.8 N • m (0.78 kgf • m, 5.6 ft • lb)
6 × 80 mm
5 × 8 mm
3.7 N • m (0.37 kgf • m, 2.7 ft • lb)
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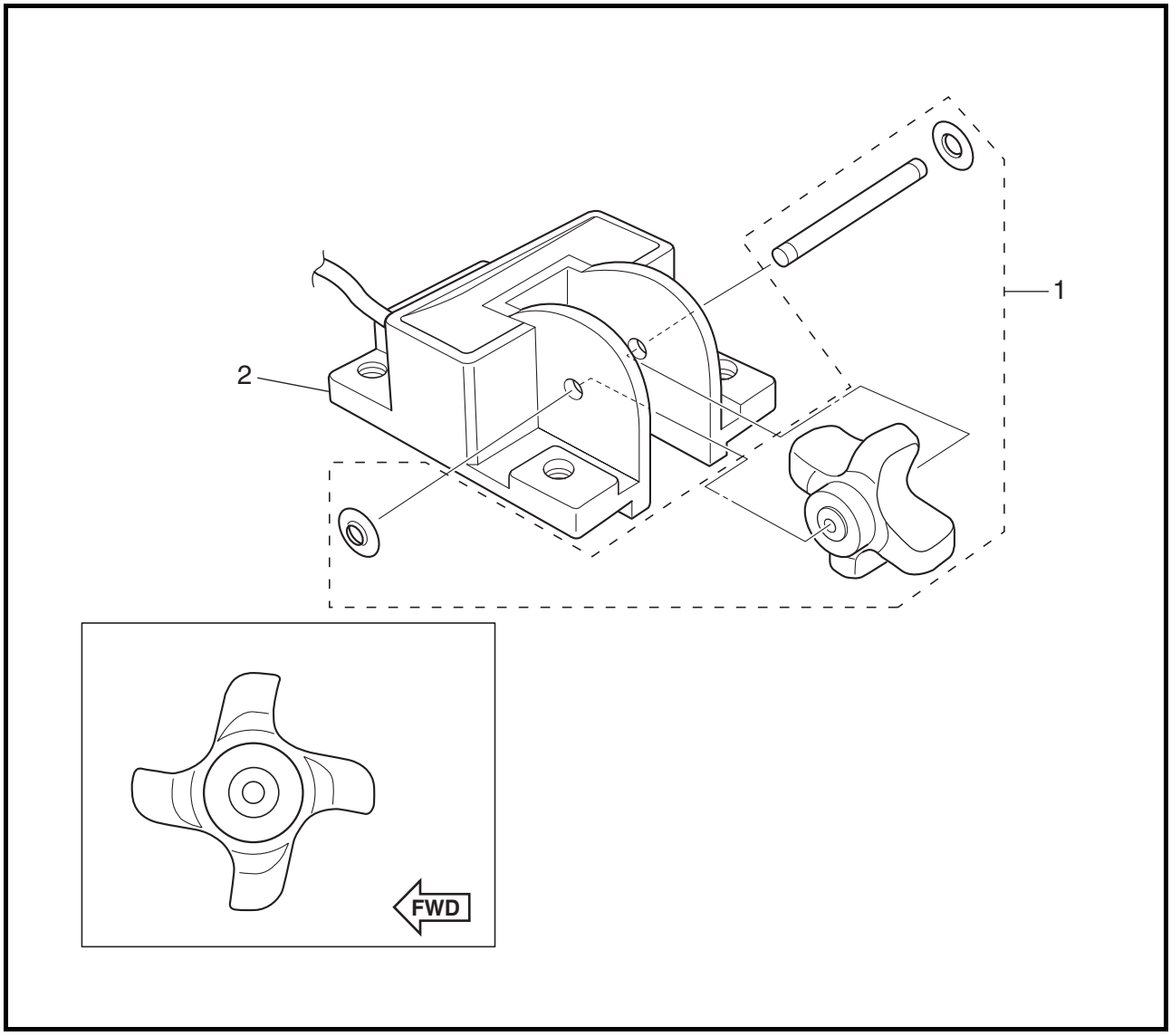
7.4 N • m (0.74 kgf • m, 5.4 ft • lb)
6 × 30 mm
7.4 N • m (0.74 kgf • m, 5.4 ft • lb)
6 × 20 mm
LT 242
LT 572
SS
A
M
4

Step	Procedure/Part name	Q'ty	Service points
18	Jet pump unit assembly	1	**NOTE:** Clean the mating surfaces before applying Yamabond No. 4. Reverse the removal steps for installation.
19	Dowel pin	2	
20	Impeller housing 2	1	
21	Dowel pin	2	

EXPLODED DIAGRAM

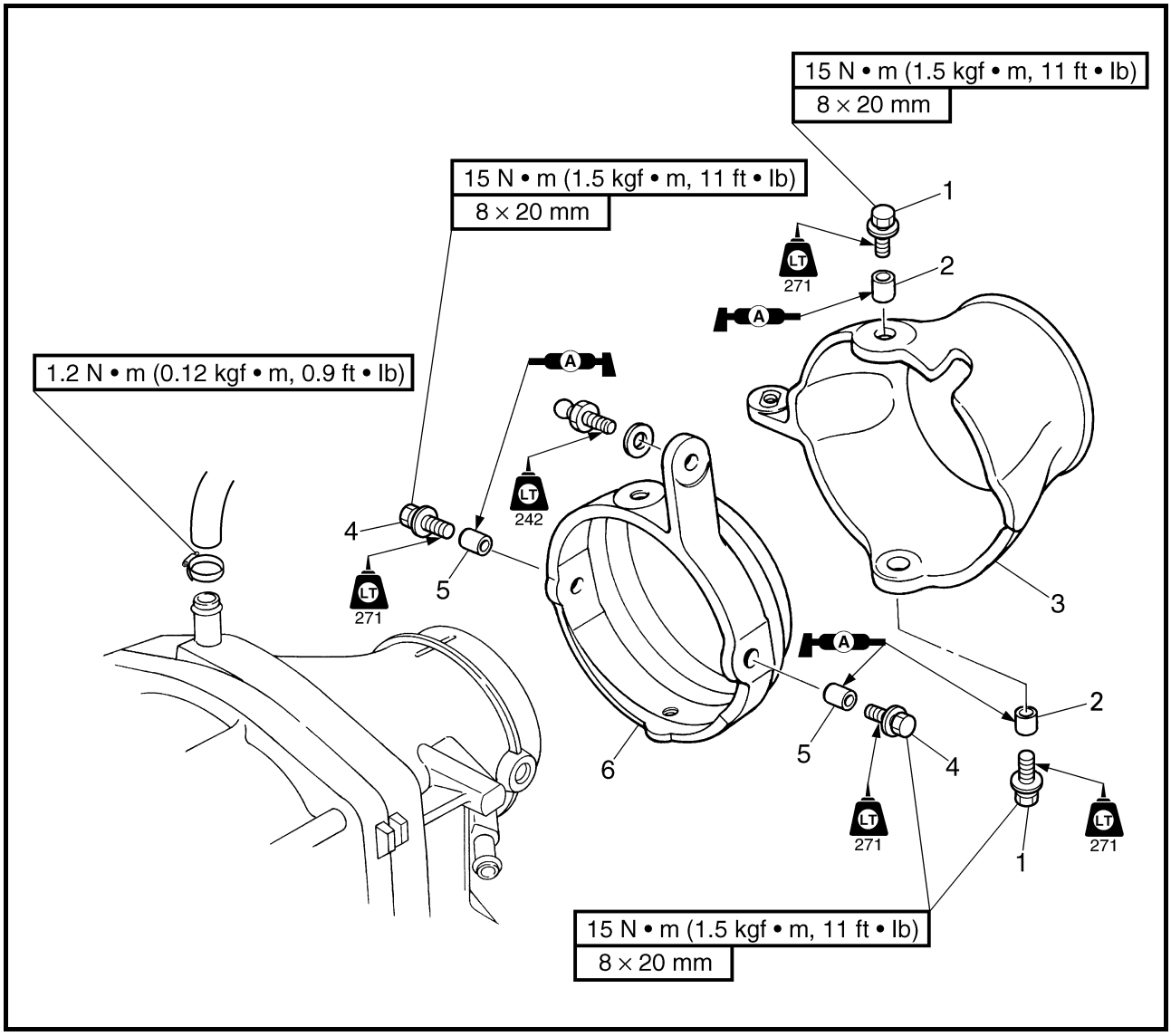


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	SPEED SENSOR DISASSEMBLY		Follow the left "Step" for disassembly.
1	Paddle wheel set	1	**Not reusable**
2	Speed sensor	1	
			Reverse the disassembly steps for assembly.

JET THRUST NOZZLE AND NOZZLE RING

EXPLODED DIAGRAM

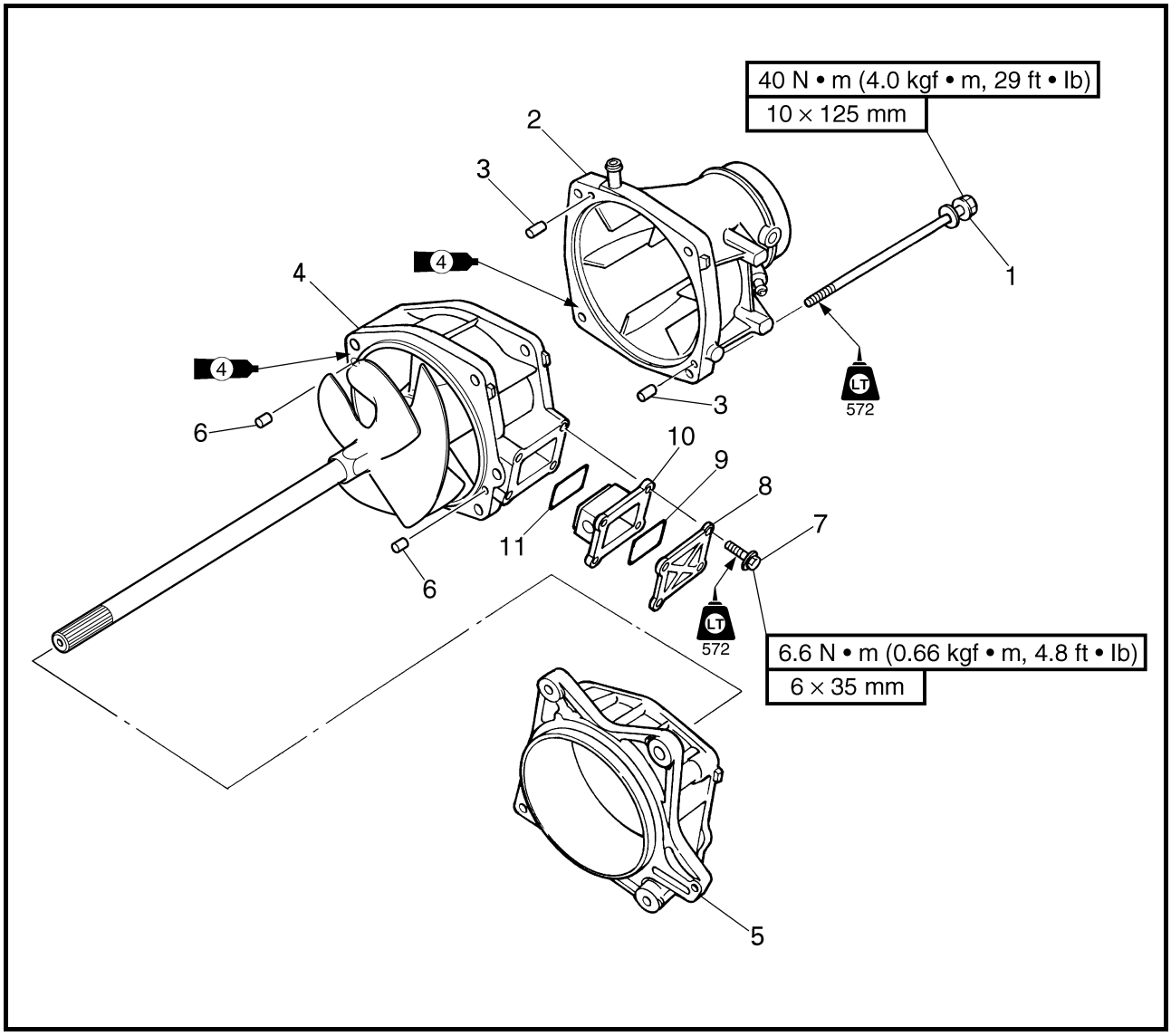


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	JET THRUST NOZZLE AND NOZZLE RING REMOVAL		Follow the left "Step" for removal.
	Jet pump unit		Refer to "JET PUMP UNIT."
1	Bolt	2	
2	Collar	2	
3	Jet thrust nozzle	1	
4	Bolt	2	
5	Collar	2	
6	Nozzle ring	1	
			Reverse the removal steps for installation.

IMPELLER DUCT AND IMPELLER HOUSING 1

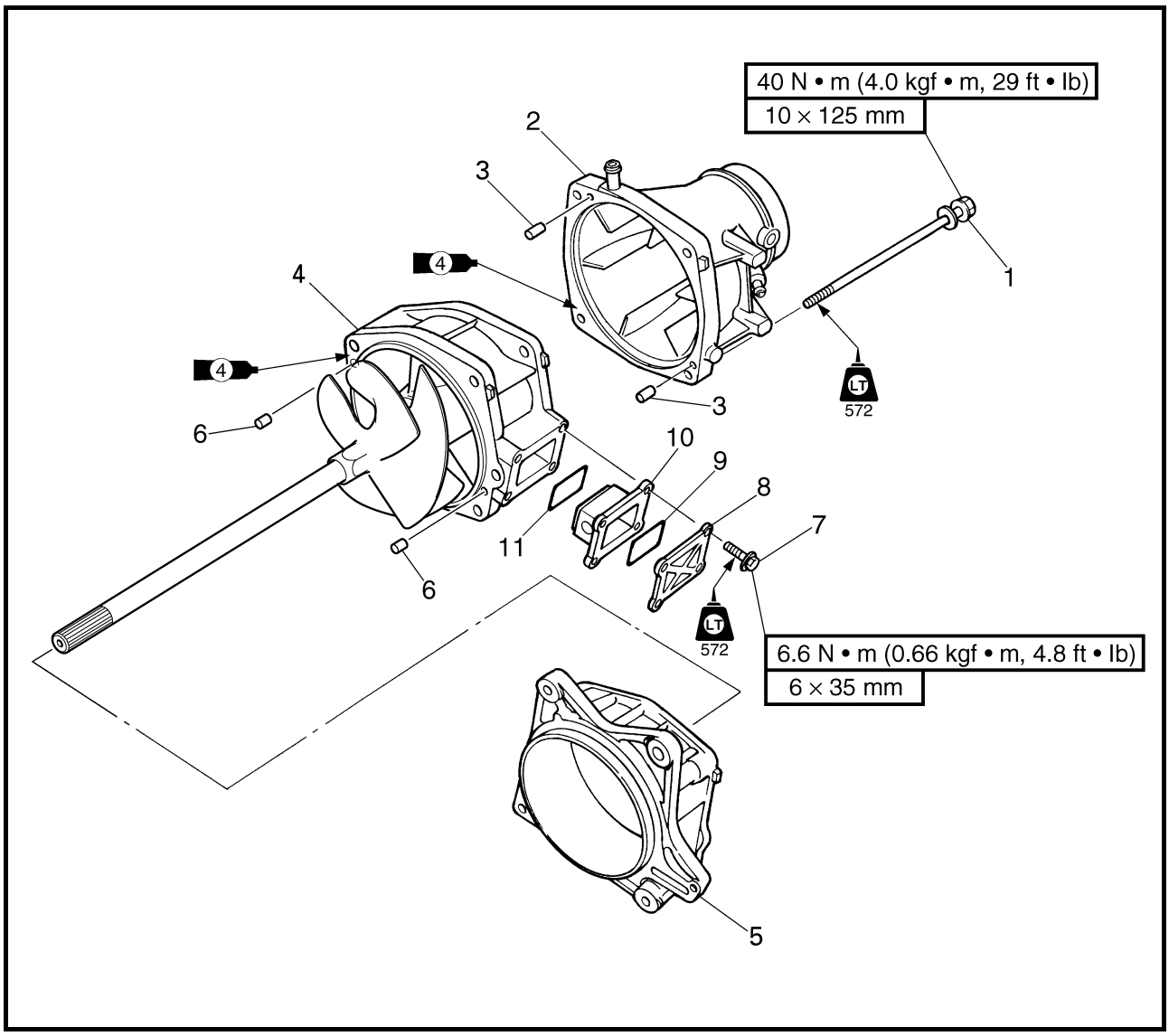
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	IMPELLER DUCT AND IMPELLER HOUSING 1 REMOVAL		Follow the left "Step" for removal.
	Nozzle ring		Refer to "JET THRUST NOZZLE AND NOZZLE RING."
1	Bolt	4	
2	Nozzle	1	**NOTE:** Clean the mating surfaces before applying Yamabond No. 4.
3	Pin	2	
4	Impeller duct assembly	1	
5	Impeller housing 1	1	
6	Pin	2	

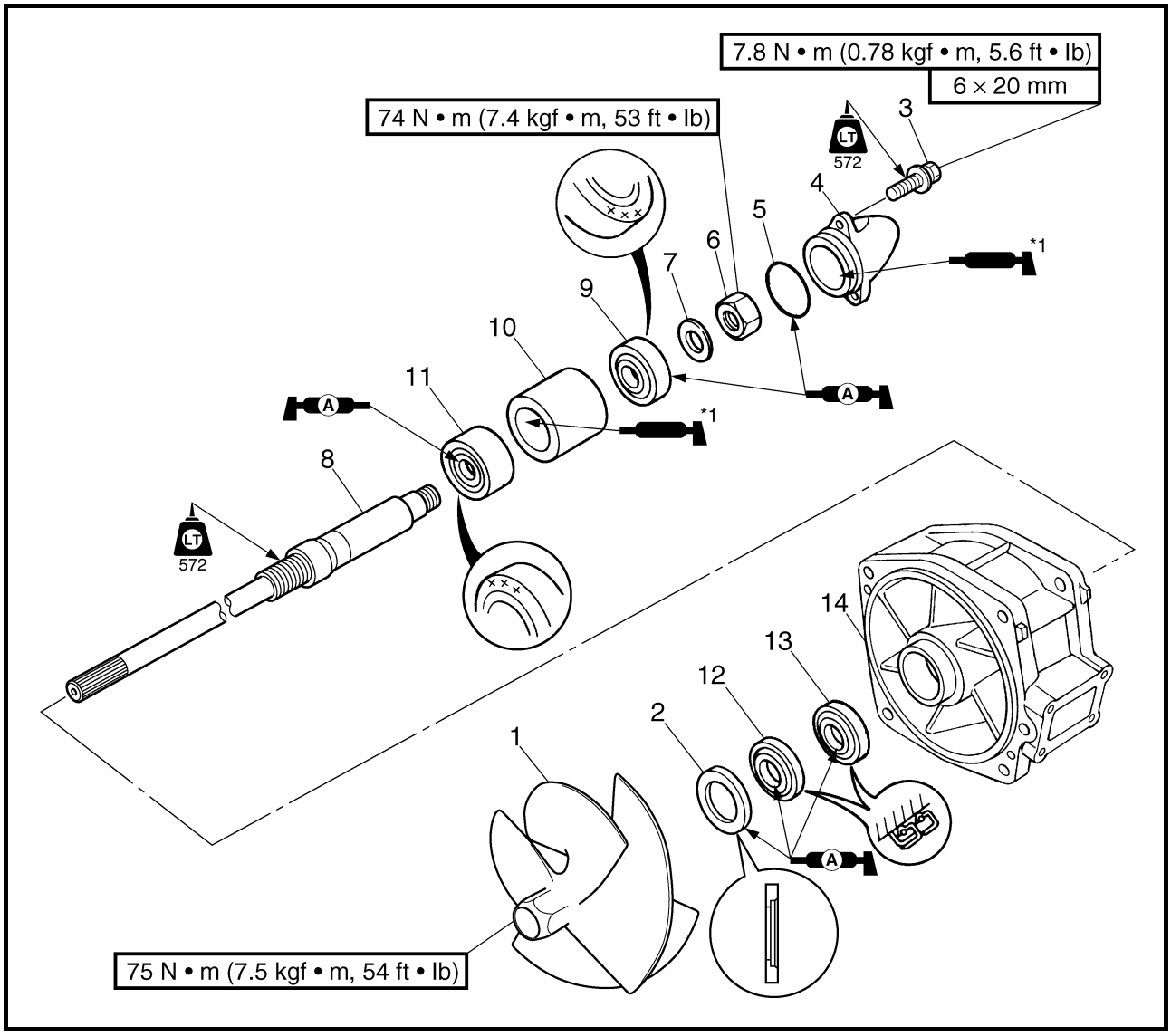
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Bolt	4	
8	Water inlet cover	1	
9	Seal	1	
10	Water inlet strainer	1	
11	Seal	1	
			Reverse the removal steps for installation.

IMPELLER DUCT AND DRIVE SHAFT

EXPLODED DIAGRAM

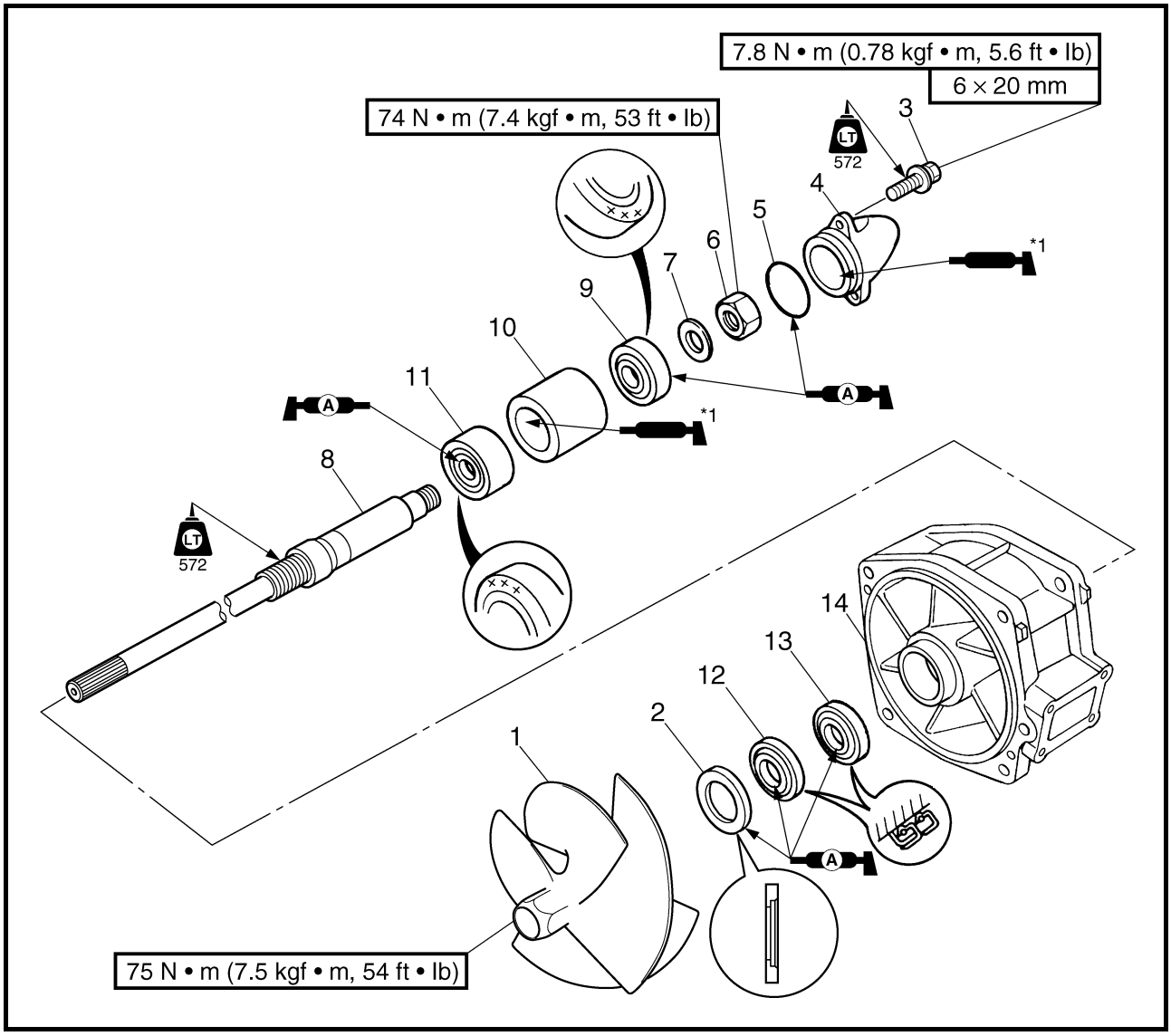


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	IMPELLER DUCT AND DRIVE SHAFT DISASSEMBLY		Follow the left "Step" for disassembly.
1	Impeller	1	Left-hand threads
2	Spacer	1	
3	Bolt	3	
4	Cap	1	
5	O-ring	1	
6	Nut	1	
7	Washer	1	

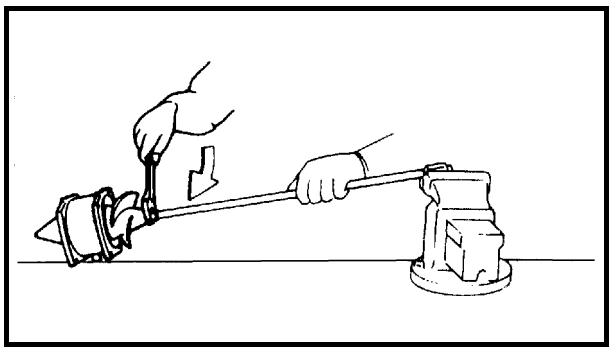
*1 EPNOC grease AP #0

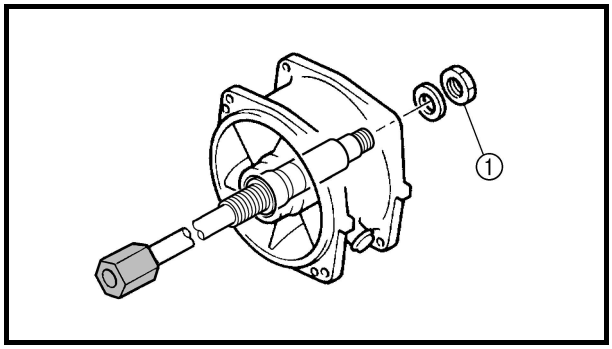
EXPLODED DIAGRAM

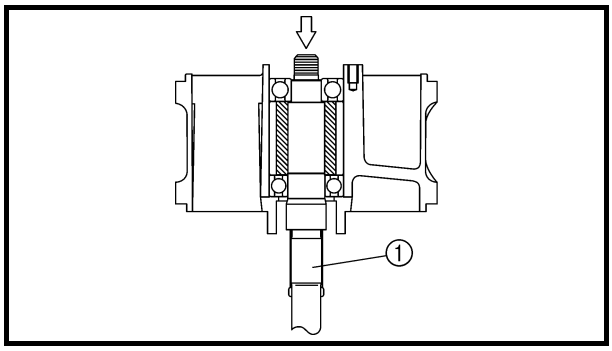


Step	Procedure/Part name	Q'ty	Service points
8	Drive shaft	1	
9	Rear bearing	1	**Not reusable**
10	Spacer	1	
11	Front bearing	1	**Not reusable**
12	Oil seal	1	**Not reusable**
13	Oil seal	1	**Not reusable**
14	Impeller duct	1	
			Reverse the disassembly steps for assembly.

*1 EPNOC grease AP #0







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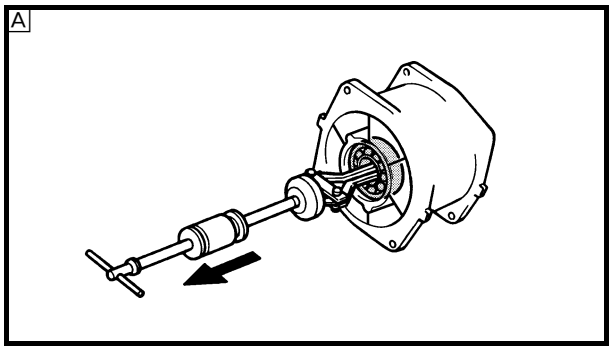
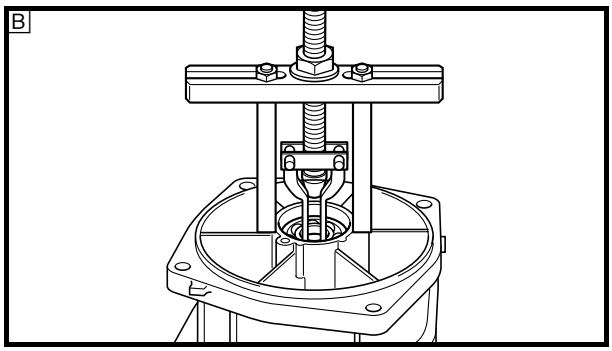


B



SERVICE POINTS

Drive shaft removal

1. Remove:
   - Impeller

Drive shaft holder:
YB-06151
Drive shaft holder 5:
90890-06519

NOTE:
The impeller has left-hand threads. Turn the impeller clockwise to loosen it.

2. Remove:
   - Nut ①

Drive shaft holder:
YB-06151
Drive shaft holder 5:
90890-06519

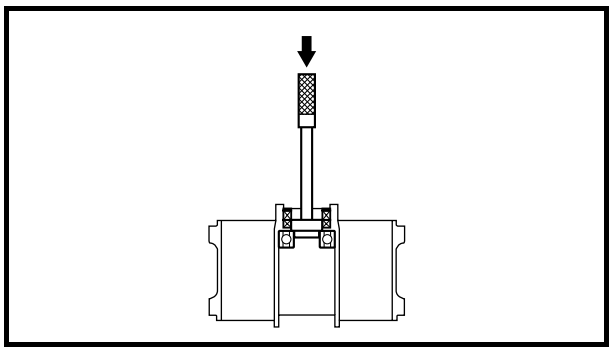
3. Remove:
   - Drive shaft ①

NOTE:
Remove the drive shaft using a press.

4. Remove:
   - Rear bearing

Slide hammer and adapters:
YB-06096
Stopper guide plate:
90890-06501
Bearing puller assembly:
90890-06535
Stopper guide stand:
90890-06538

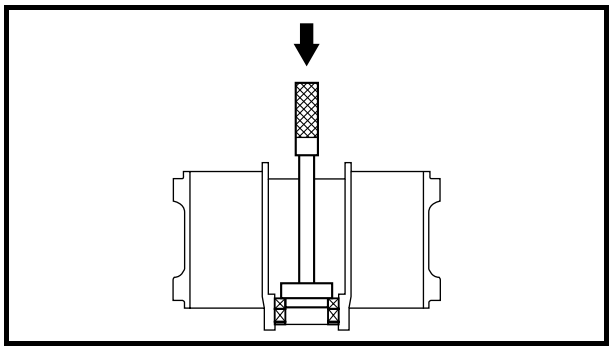
A For USA and Canada
B For Worldwide



5. Remove:
   - Front bearing

Driver handle—large:
YB-06071
Driver rod L3:
90890-06652
Bearing housing needle bearing remover:
YB-06112
Needle bearing attachment:
90890-06614

NOTE:
Remove the front bearing using a press.



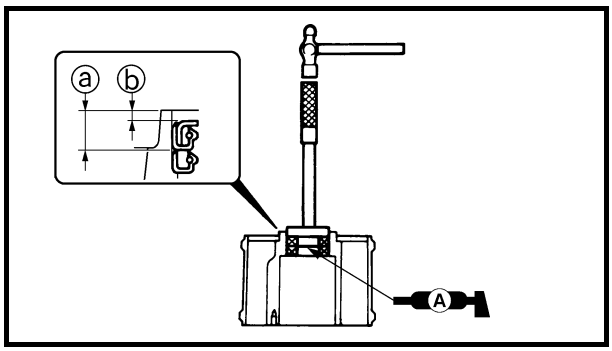
6. Remove:
   - Oil seal

Driver handle—large:
YB-06071
Driver rod L3:
90890-06652
Drive shaft needle bearing installer and remover:
YB-06196
Needle bearing attachment:
90890-06653

NOTE:
Remove the oil seals using a press.

Impeller inspection
Refer to “JET PUMP UNIT” in Chapter 3.

Drive shaft inspection
1. Check:
   - Drive shaft
     Damage/wear → Replace.

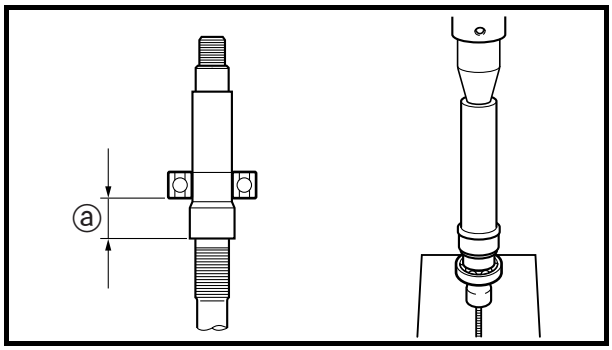


Drive shaft installation

1. Install:
   - Oil seals

Driver handle—large:
YB-06071
Driver rod LS:
90890-06606
Outer race installer—forward gear:
YB-06085
Ball bearing attachment:
90890-06634

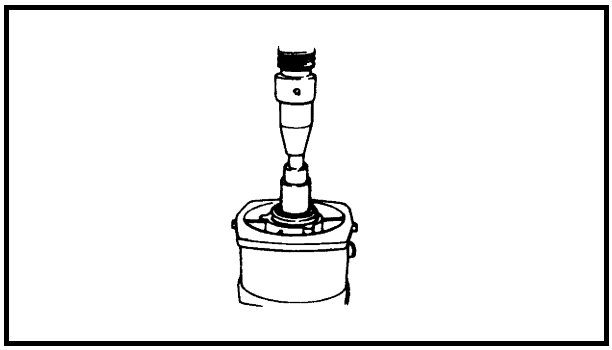
Distance ⓐ:
14.2 ± 0.2 mm (0.56 ± 0.01 in)
Distance ⓑ:
4.7 ± 0.2 mm (0.19 ± 0.01 in)



2. Install:
   - Front bearing
   - Drive shaft

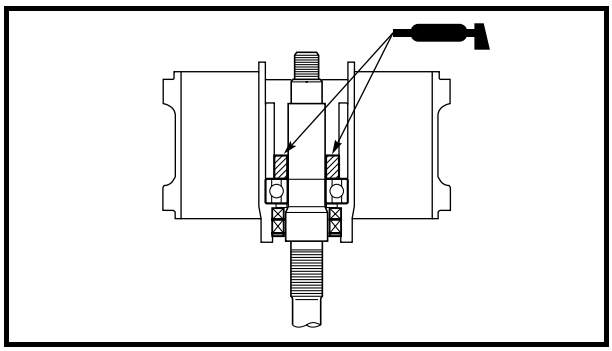
NOTE:
Install the front bearing and drive shaft using a press.

Distance ⓐ:
23.0 ± 0.1 mm (0.906 ± 0.004 in)



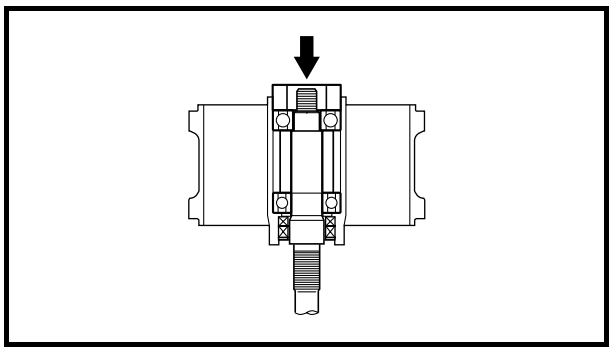
3. Install:
   - Drive shaft (with front bearing)
   - Spacer
   - Impeller duct

NOTE:
Press the spacer and the front bearing with a pipe that is more than 33 mm (1.30 in) long, and which has an outer diameter less than 50 mm (1.97 in) and an inner diameter more than 26 mm (1.02 in).



4. Add:
   - EPNOC grease AP #0
     (between the drive shaft and spacer)

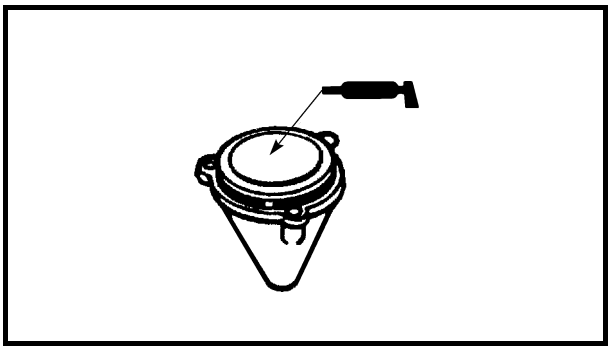
Quantity:
Approximately 1/3 of capacity



5. Install:
   - Rear bearing

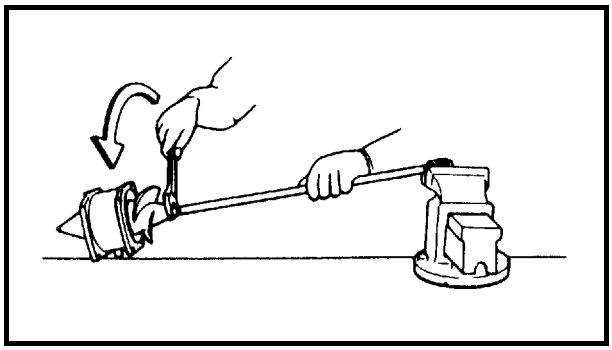
Drive shaft needle bearing depth stop:
YB-34474

NOTE:
- Press the bearing inner/outer race at the same time holding the drive shaft and impeller duct.
- If a bearing inner/outer race attachment is not available, use a washer or pipe with an outer diameter of 47–50 mm (1.85–1.97 in) and an inner diameter of 21–25 mm (0.83–0.98 in).



6. Add:
   - EPNOC grease AP #0 (into the cap)

Quantity:
Approximately 1/3 of capacity



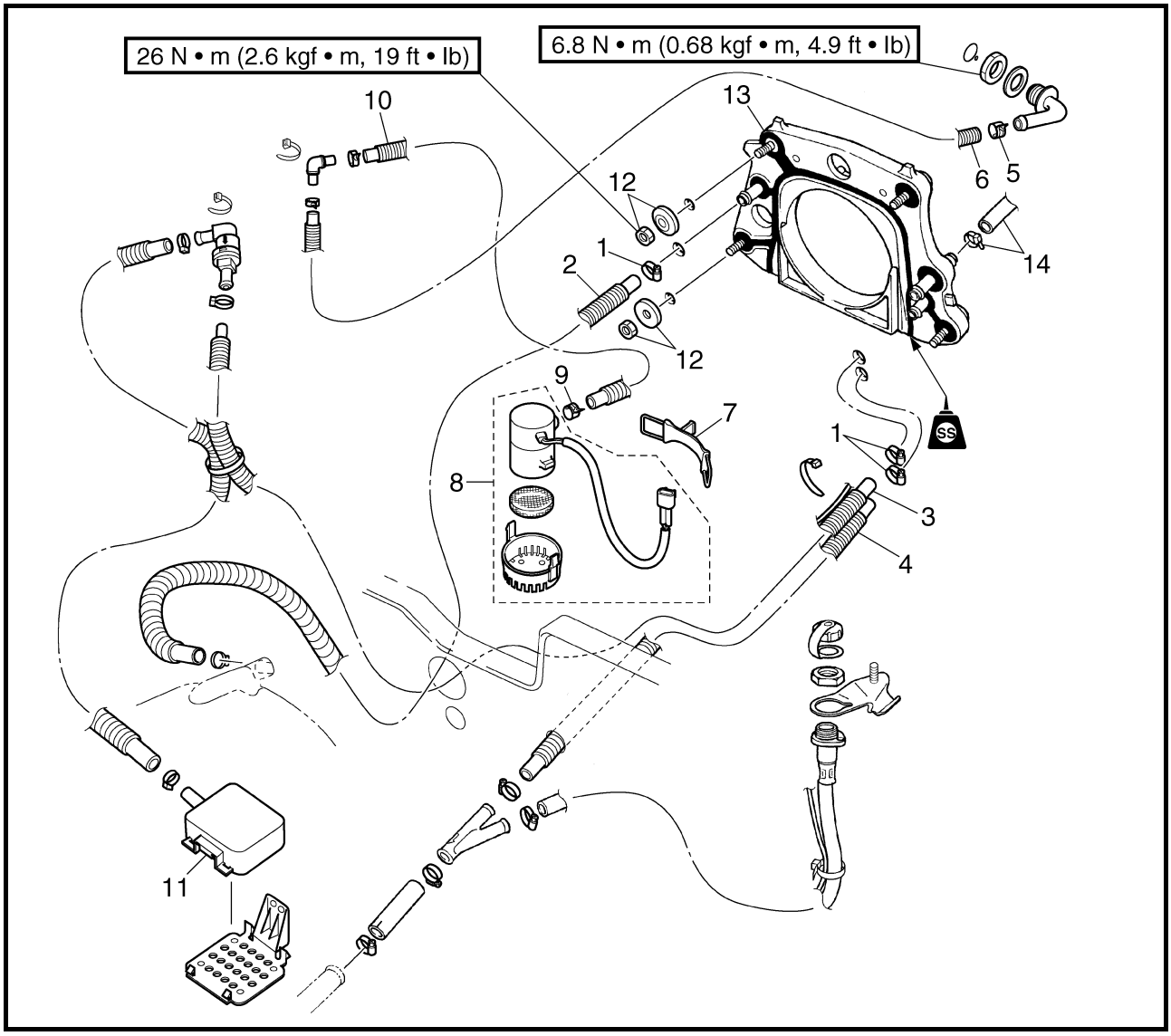
7. Install:
   - Nut
   - Impeller

Drive shaft nut:
74 N • m (7.4 kgf • m, 53 ft • lb)
Impeller:
75 N • m (7.5 kgf • m, 54 ft • lb)
LOCTITE 572

Drive shaft holder:
YB-06151
Drive shaft holder 5:
90890-06519

TRANSOM PLATE AND HOSES

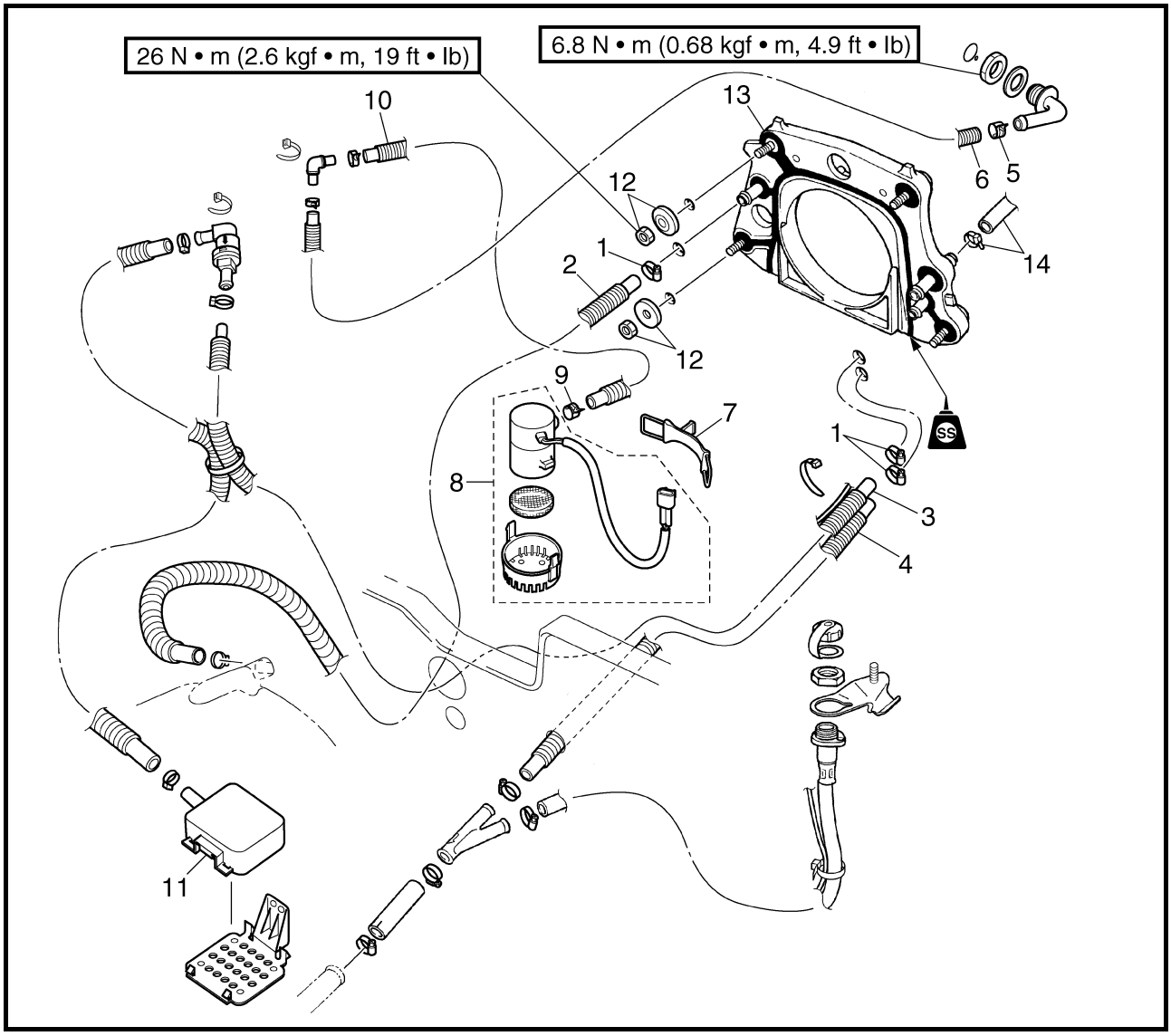
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	TRANSOM PLATE AND HOSE REMOVAL		Follow the left "Step" for removal.
	Exhaust system		Refer to "EXHAUST SYSTEM" in Chapter 8.
	Jet pump unit assembly		Refer to "JET PUMP UNIT."
1	Hose screw clamp	3	
2	Cooling water hose	1	To cooling water outlet
3	Bilge hose 2	1	**NOTE:** Route bilge hose 2 under the drive shaft tube.
4	Cooling water hose	1	From cooling water inlet
5	Hose clamp	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Bilge hose 4	1	
7	Band	1	
8	Electric bilge pump assembly	1	
9	Hose clamp	1	
10	Bilge hose 3	1	
11	Bilge strainer	1	
12	Nut/washer	4/4	
13	Transom plate	1	
14	Plastic tie/bilge hose 5	1/1	
			Reverse the removal steps for installation.

SERVICE POINTS

Bilge strainer inspection

Refer to “JET PUMP UNIT” in Chapter 3.

Electric bilge pump inspection

Refer to “BILGE PUMP” in Chapter 3.
Refer to “ELECTRIC BILGE PUMP” in Chapter 7.

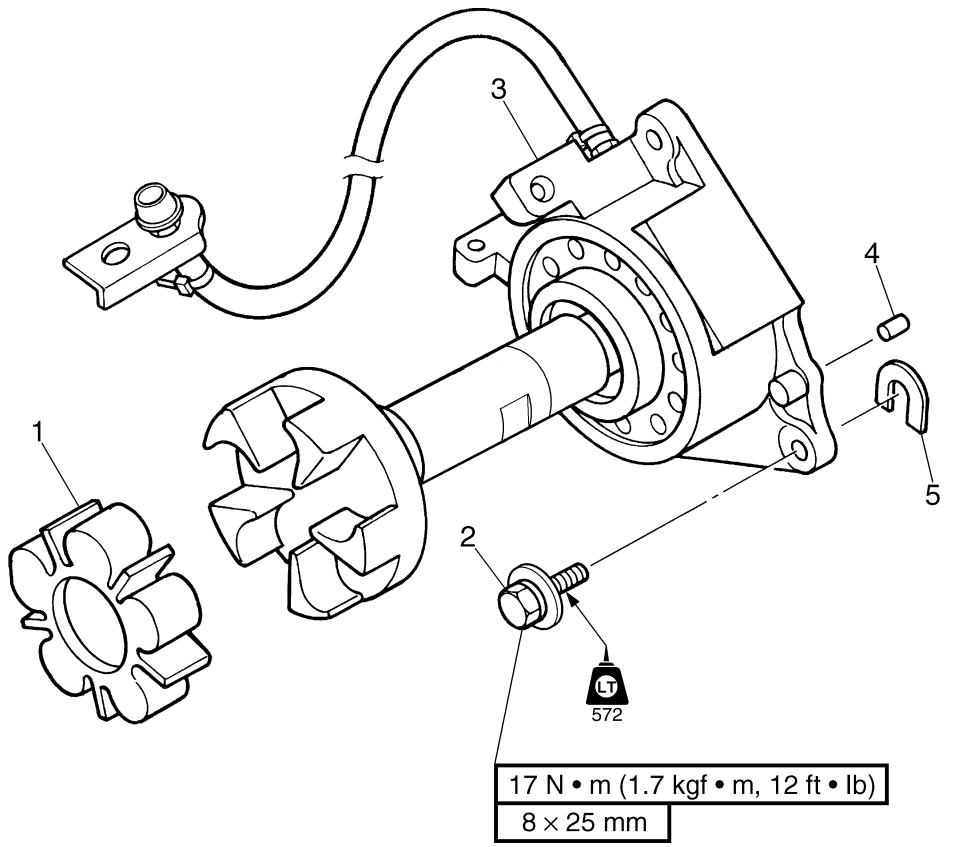
Bilge hose inspection

1. Check:
   - Bilge hoses
     Cracks/damage/wear → Replace.

Cooling water hose inspection

1. Check:
   - Cooling water hoses
     Cracks/damage/wear → Replace.

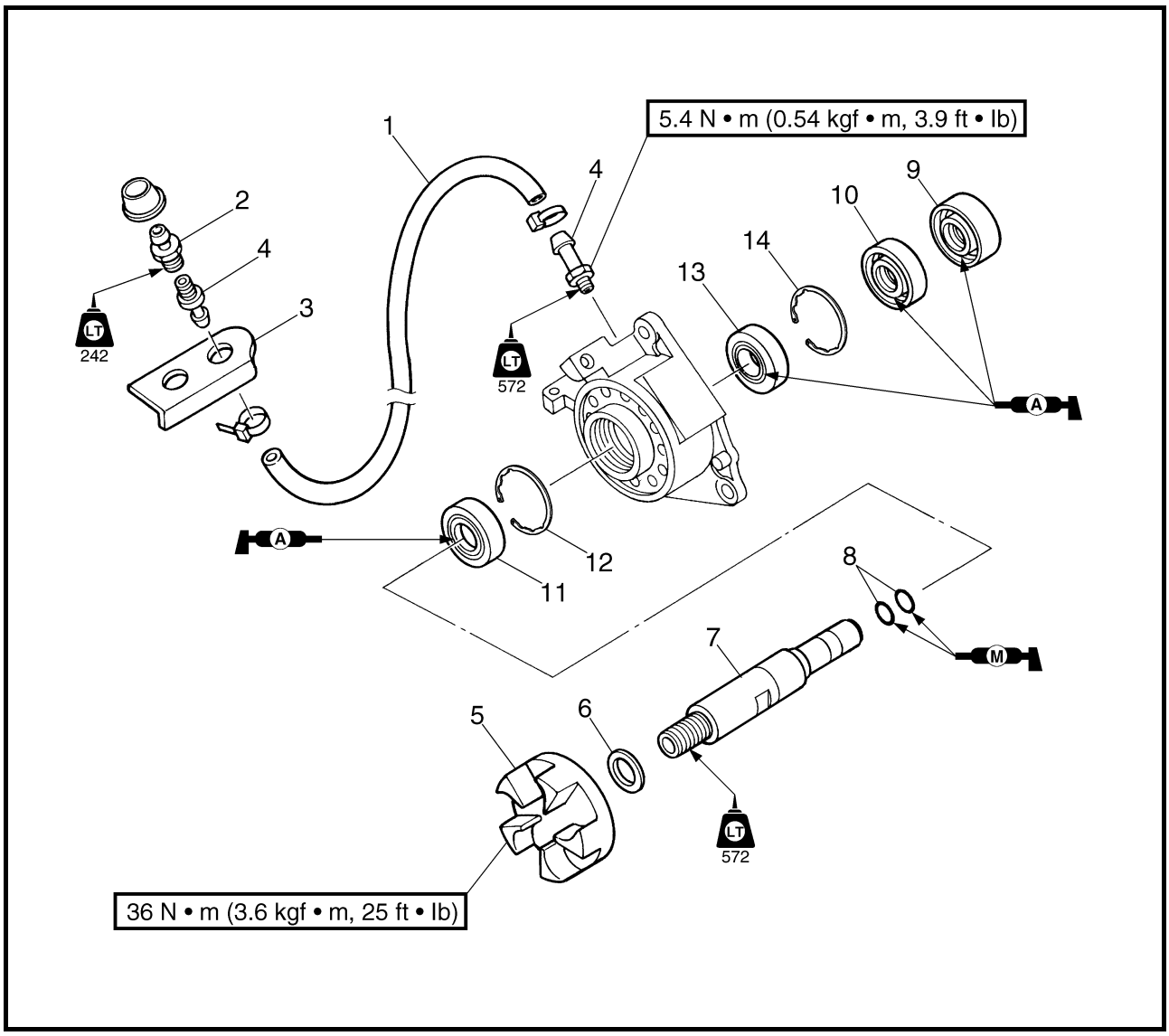
BEARING HOUSING
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	BEARING HOUSING REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT" in Chapter 5.
1	Rubber coupling	1	
2	Bolt	3	
3	Intermediate housing assembly	1	
4	Pin	2	
5	Shim	—	As required
			NOTE: Install shims in their original positions.
			Reverse the removal steps for installation.

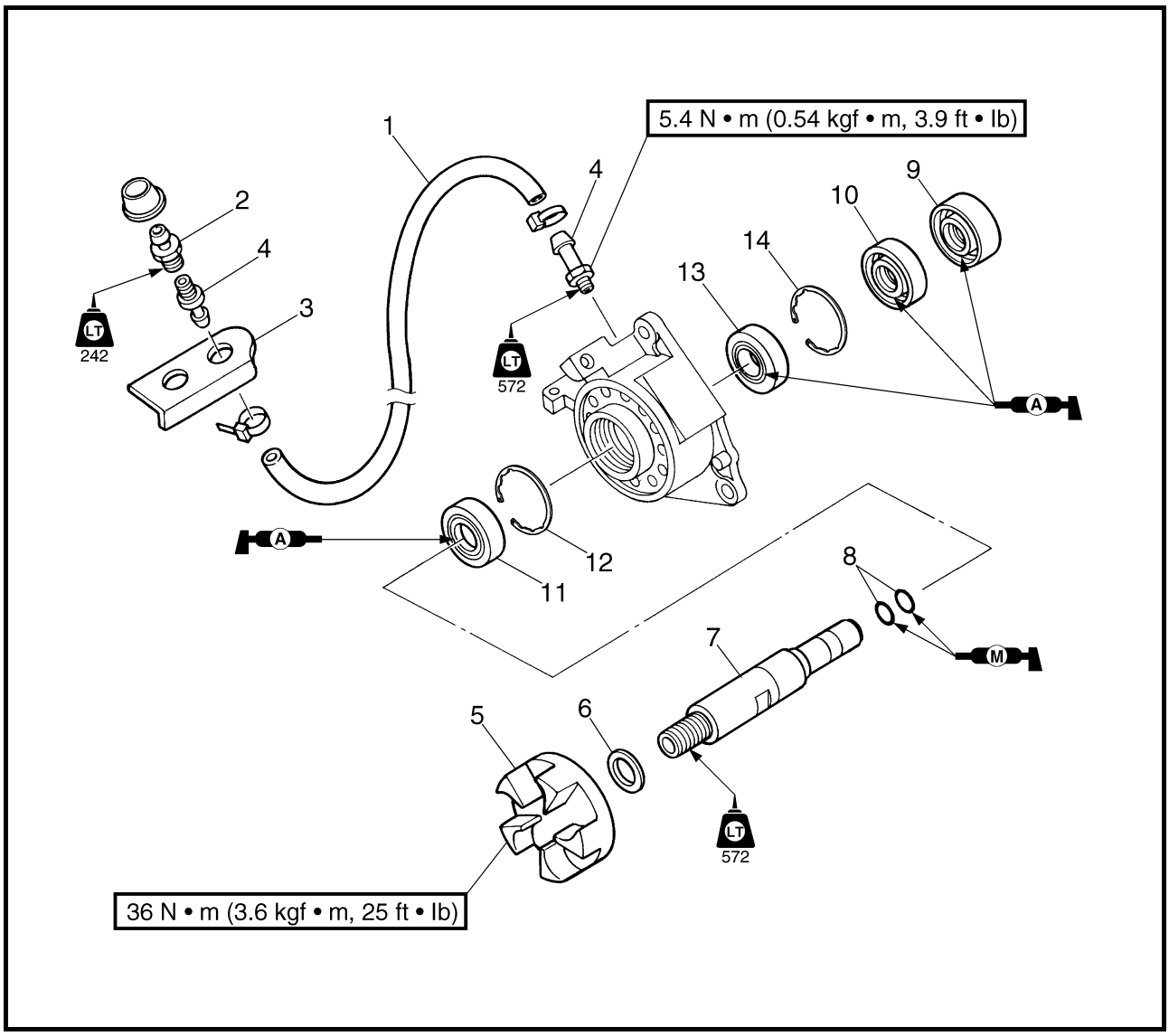
EXPLODED DIAGRAM



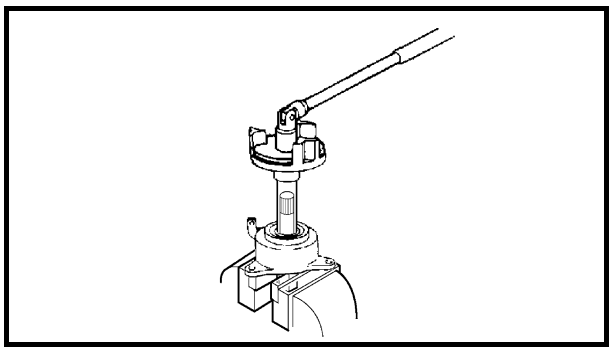
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	BEARING HOUSING DISASSEMBLY		Follow the left "Step" for disassembly.
1	Grease hose	1	
2	Grease nipple	1	
3	Grease nipple stay	1	
4	Nipple	2	
5	Driven coupling	1	
6	Washer	1	
7	Intermediate drive shaft	1	
8	O-ring	2	**Not reusable**

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Oil seal	1	**Not reusable**
10	Oil seal	1	**Not reusable**
11	Oil seal	1	**Not reusable**
12	Circlip	1	
13	Bearing	1	**Not reusable**
14	Circlip	1	
			Reverse the disassembly steps for assembly.



SERVICE POINTS

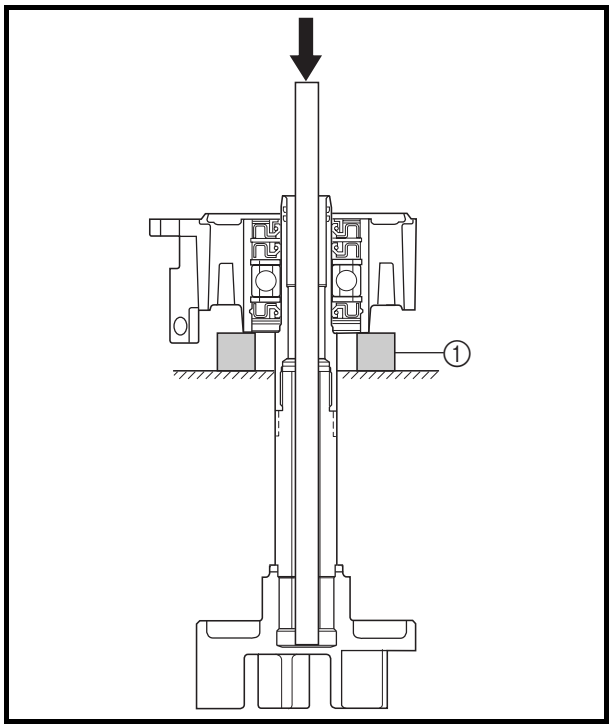
Driven coupling removal and installation

1. Remove and install:
   - Driven coupling

Driven coupling:
36 N • m (3.6 kgf • m, 25 ft • lb)
LOCTITE 572

Coupler wrench:
YW-06551/90890-06551
Shaft holder:
YB-06552
Crankshaft holder 20:
90890-06552

NOTE:
Install the driven coupling with the same special service tools that were used for removal.

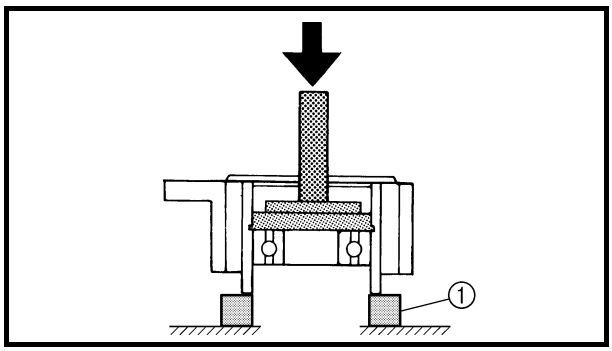


Intermediate drive shaft removal

1. Remove:
   - Intermediate drive shaft

Removal steps:
- Temporarily install the driven coupling to the intermediate drive shaft.
- Insert a long rod to the intermediate drive shaft.
- Press out the intermediate drive shaft by pushing the rod.

NOTE:
Support the intermediate housing with steel blocks ① and press the intermediate drive shaft with a rod that is more than 280 mm (11.02 in) long, and which has an outer diameter less than 13 mm (0.51 in).



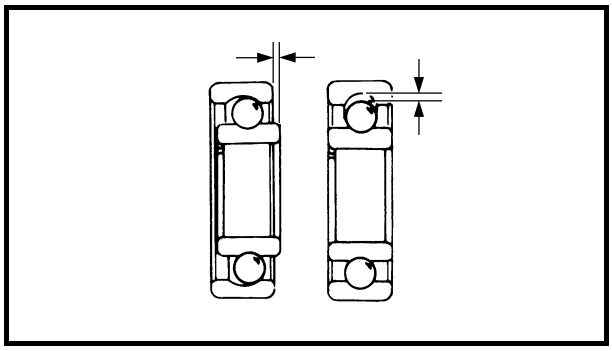
Bearing removal

1. Remove:
   - Bearing

Driver handle—large:
YB-06071
Driver rod LS:
90890-06606
Drive shaft taper roller bearing cup installer:
YB-06156
Bearing outer race attachment:
90890-06626

NOTE:

- Install the bearing with the same special service tools that were used for removal.
- Support the intermediate housing with steel blocks ① and remove the bearing using a press.



Bearing, intermediate drive shaft, and grease hose inspection

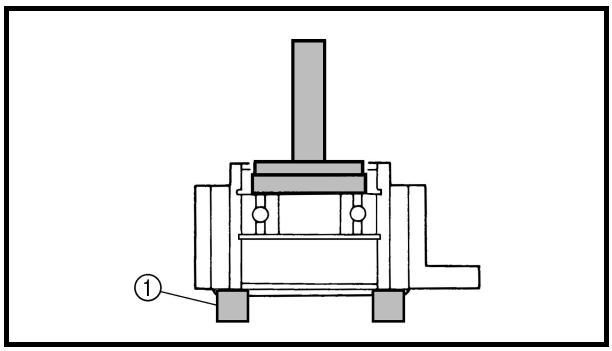
1. Check:
   - Bearing
     Rotate the inner race by hand.
     Damage/rough movement → Replace.
   - Intermediate drive shaft
     Damage/pitting → Replace.
   - Grease hose
     Cracks/wear → Replace.

Driven coupling inspection

1. Check:
   - Driven coupling
   - Driven coupling damper
     Damage/wear → Replace.

Bearing installation

1. Install:
   - Circlip (rear)



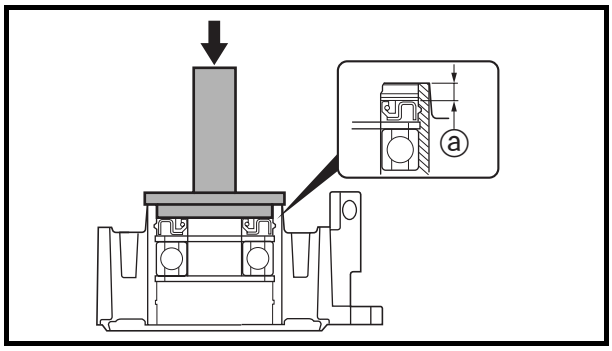
2. Install:
   • Bearing

Driver handle—large:
YB-06071
Driver rod LS:
90890-06606
Drive shaft taper roller bearing cup installer:
YB-06156
Bearing outer race attachment:
90890-06626

NOTE:
Support the intermediate housing with steel blocks ① and install the bearing using a press.

Oil seal installation

1. Install:
   • Oil seal

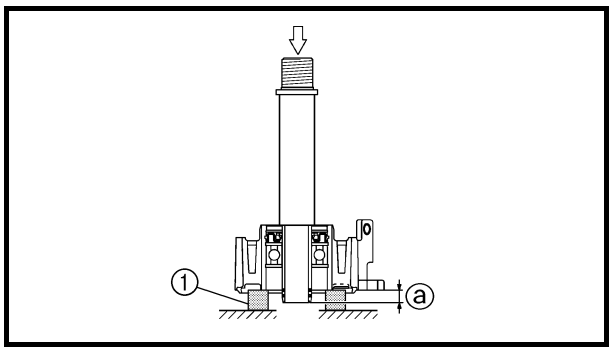


Driver handle—large:
YB-06071
Driver rod LS:
90890-06606
Drive shaft taper roller bearing cup installer:
YB-06156
Bearing outer race attachment:
90890-06626

NOTE:
Before installing the oil seal, lubricate the clip groove with water-resistant grease.

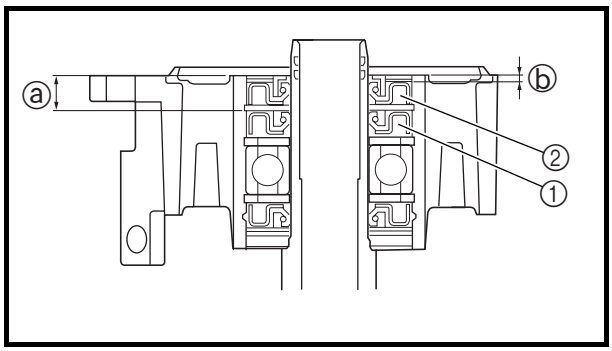
Distance ⓐ:
6.8–7.2 mm (0.27–0.28 in)

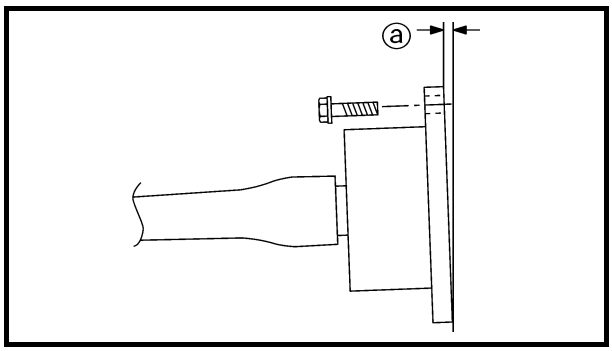
2. Install:
   • Intermediate drive shaft



Distance ⓐ:
9.5–10.5 mm (0.37–0.41 in)

NOTE:
Support the intermediate housing with steel blocks ① and install the intermediate drive shaft using a press.





3. Install:
   - Oil seal ① [8 mm (0.31 in)]
   - Oil seal ② [10 mm (0.39 in)]

Distance ⓐ:
10.3–10.7 mm (0.41–0.42 in)
Distance ⓑ:
1.6–2.0 mm (0.06–0.08 in)

Intermediate housing installation

1. Install:
   - Intermediate housing
   - Shim(s)
   - Bolts

Installation steps:
- Install the intermediate housing.
- Measure the clearance ⓐ at each bolt hole.
- Install the suitable shim from the table below.

Clearance ⓐ	Shim thickness
0–0.2 mm (0–0.008 in)	Not needed
0.3–0.7 mm (0.012–0.028 in)	0.5 mm
0.8–1.2 mm (0.031–0.047 in)	1.0 mm
1.3–2.0 mm (0.051–0.079 in)	1.5 mm

Intermediate housing bolt:
17 N • m (1.7 kgf • m, 12 ft • lb)
LOCTITE 572

NOTE:
Install shims in their original positions if the intermediate housing is not replaced.

CHAPTER 7
ELECTRICAL SYSTEM

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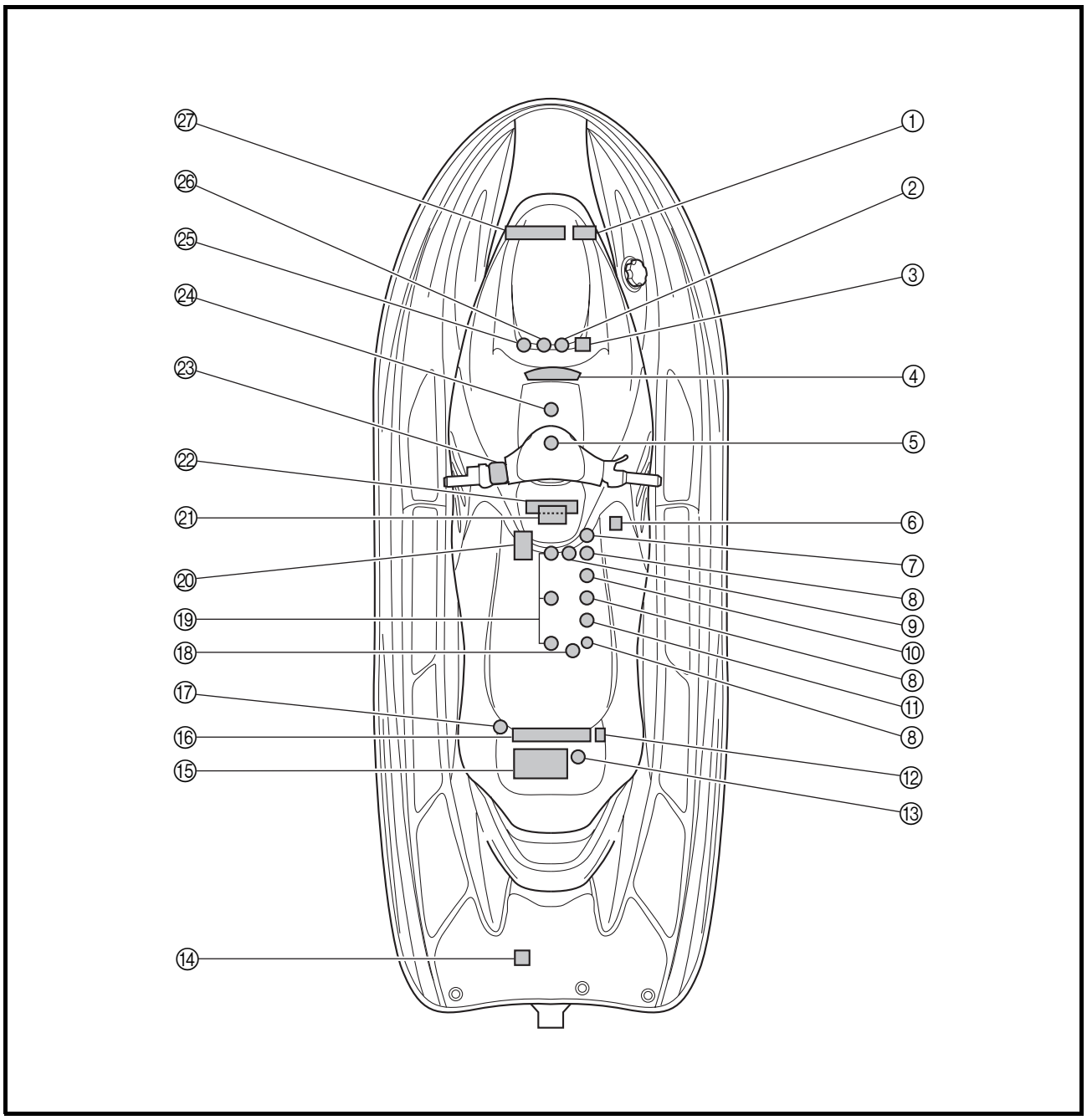
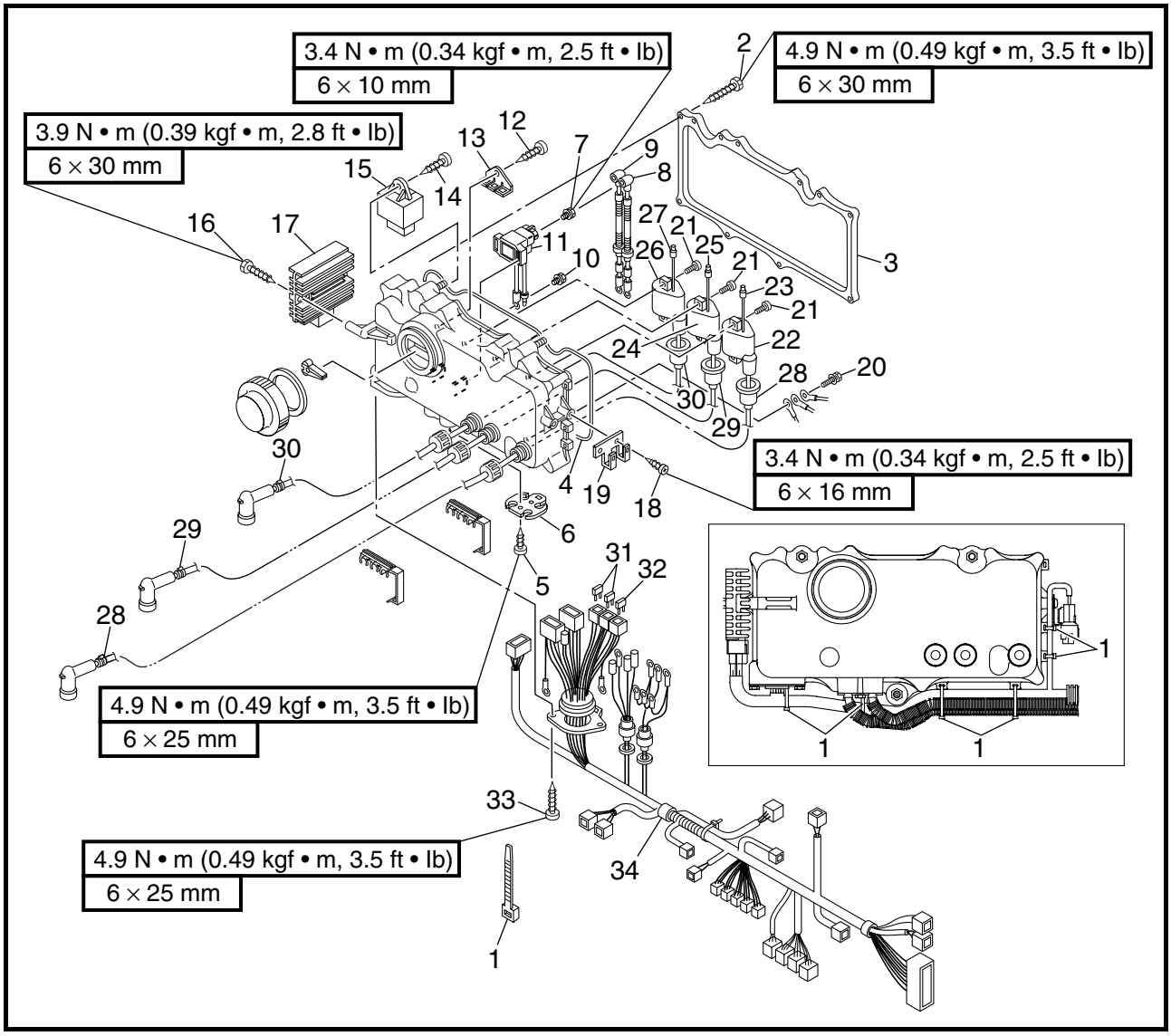
ELECTRICAL COMPONENTS



① Slant detection switch
② Fuel pump
③ Atmospheric pressure sensor
④ Multifunction meter
⑤ Steering switch
⑥ Intake air temperature sensor
⑦ Throttle position sensor
⑧ Fuel injectors
⑨ Engine temperature sensor
⑩ Throttle switch
⑪ Stepping motor
⑫ Rectifier/regulator
⑬ Electric bilge pump
⑭ Speed sensor
⑮ Battery
⑯ Electrical box
⑰ Cooling water temperature sensor
⑱ Exhaust temperature sensor
⑲ Spark plugs
⑳ Starter motor
㉑ YPVS servomotor
㉒ Lighting coil and pickup coil
㉓ Engine stop switch, engine shut-off switch, and start switch
㉔ Oil level sensor
㉕ Buzzer
㉖ Fuel sender
㉗ ECM

ELECTRICAL BOX
EXPLODED DIAGRAM


3.4 N • m (0.34 kgf • m, 2.5 ft • lb)
6 × 10 mm
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)
6 × 30 mm
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6 × 30 mm
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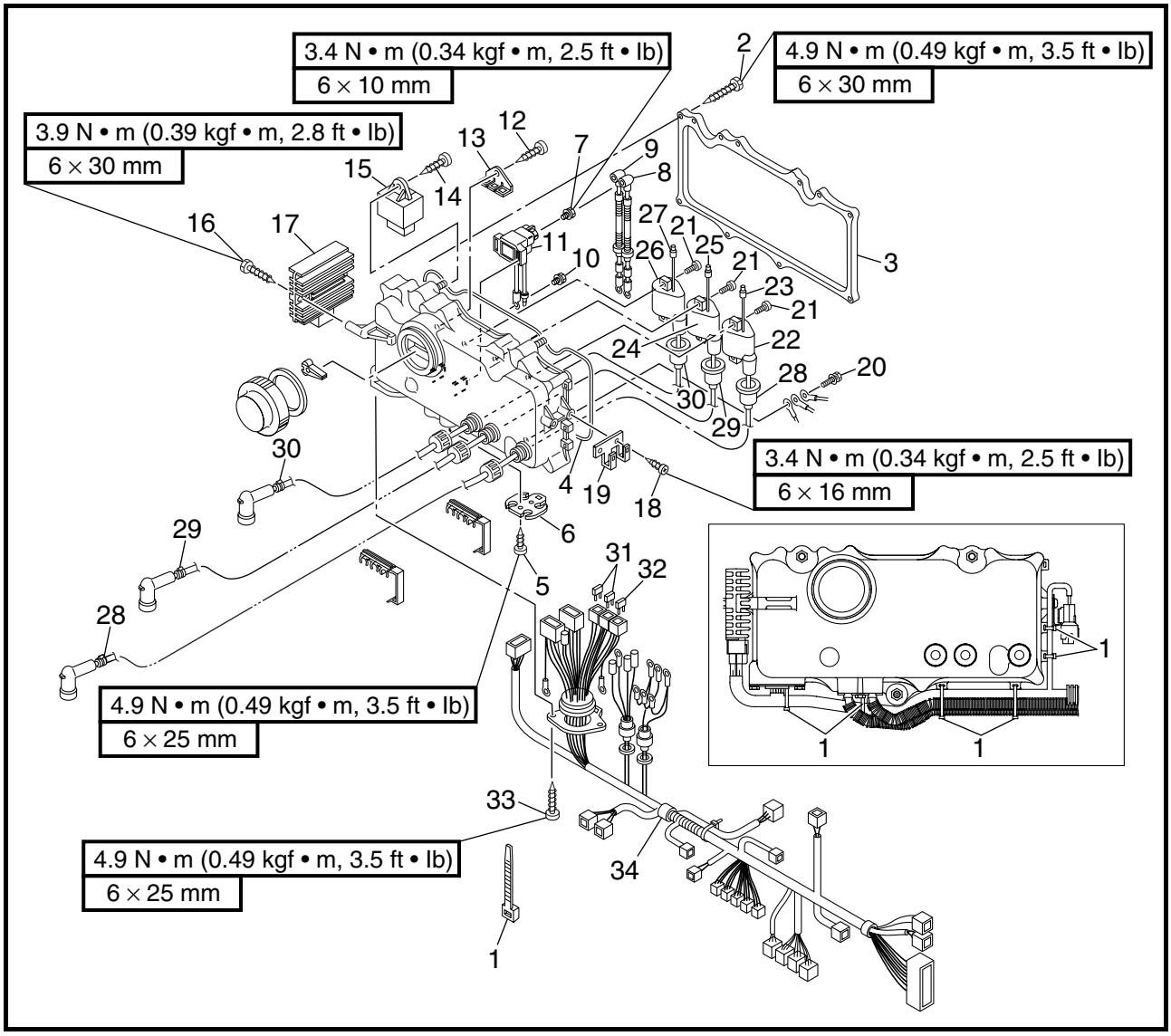
6 × 16 mm
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)
6 × 25 mm
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)
6 × 25 mm

REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ELECTRICAL BOX DISASSEMBLY		Follow the left "Step" for disassembly.
1	Plastic tie	6	**Not reusable**
2	Tapping screw	11	
3	Cover	1	
4	Gasket	1	
5	Tapping screw	2	
6	Lead holder	1	
7	Bolt	2	
8	Positive battery lead	1	
9	Stator motor lead	1	

EXPLODED DIAGRAM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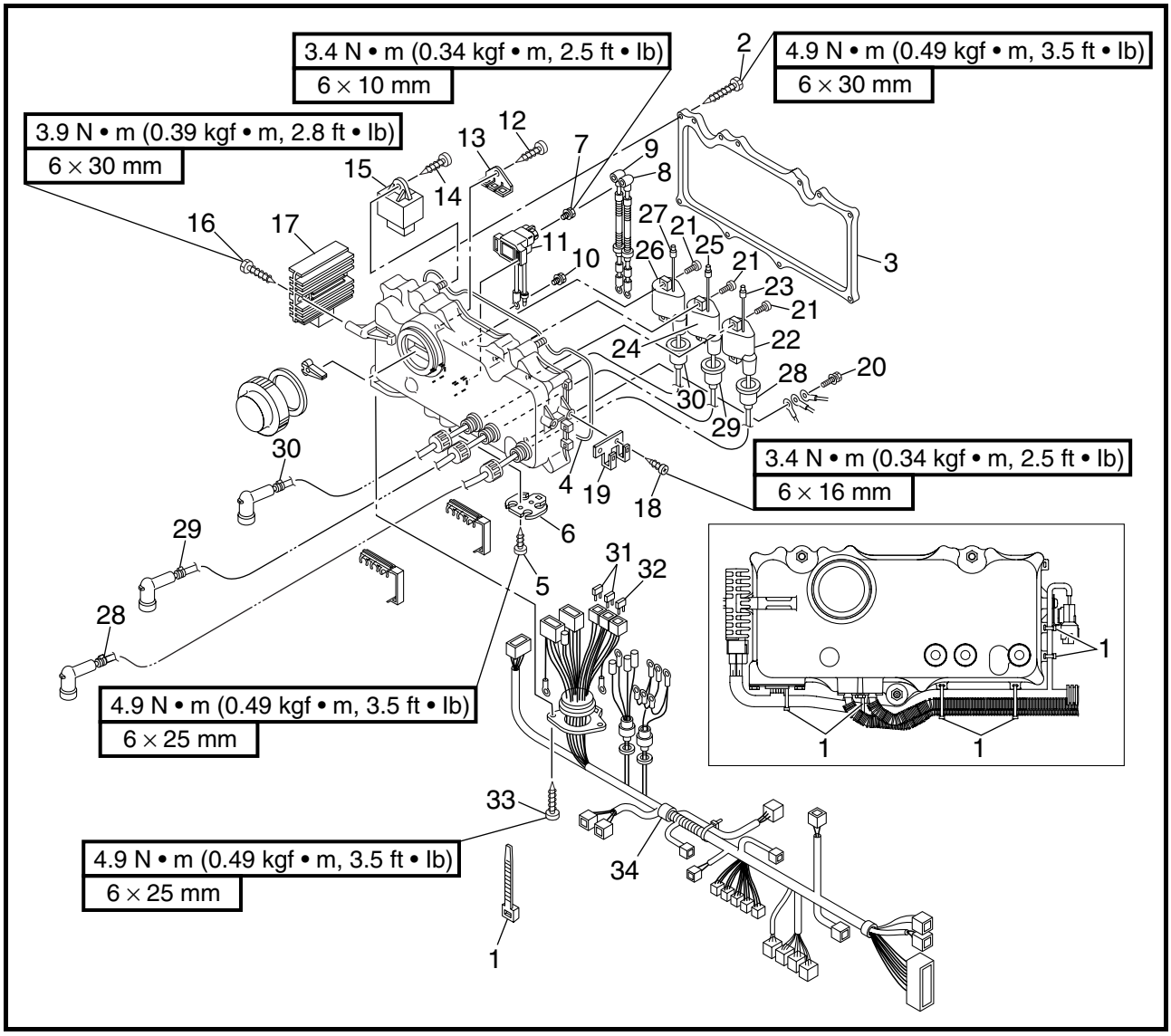
6 × 25 mm

Step	Procedure/Part name	Q'ty	Service points
10	Bolt	1	
11	Starter relay	1	
12	Tapping screw	1	
13	Fuse holder stay	1	
14	Tapping screw	1	
15	Main and fuel pump relay	1	
16	Tapping screw	2	
17	Rectifier/regulator	1	
18	Tapping screw	2	
19	Coupler bracket	1	
20	Bolt	2	

EXPLODED DIAGRAM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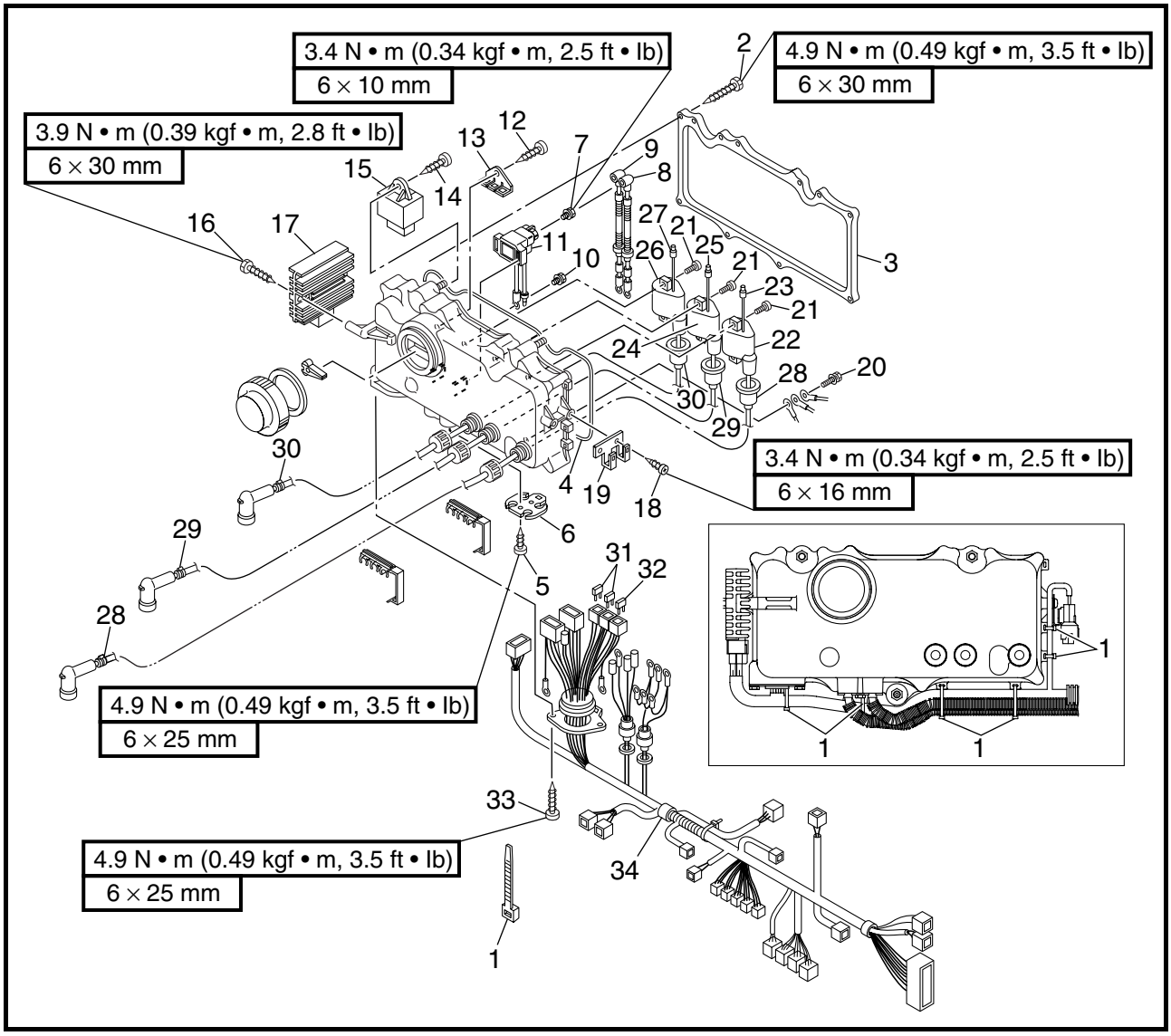
6 × 25 mm
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)
6 × 25 mm

Step	Procedure/Part name	Q'ty	Service points
21	Tapping screw	6	
22	Ignition coil #1	1	
23	Ignition coil #1 lead	1	
24	Ignition coil #2	1	
25	Ignition coil #2 lead	1	
26	Ignition coil #3	1	
27	Ignition coil #3 lead	1	
28	Spark plug lead #1/cap	1/1	
29	Spark plug lead #2/cap	1/1	
30	Spark plug lead #3/cap	1/1	
31	Fuse (3 A)	2	

EXPLODED DIAGRAM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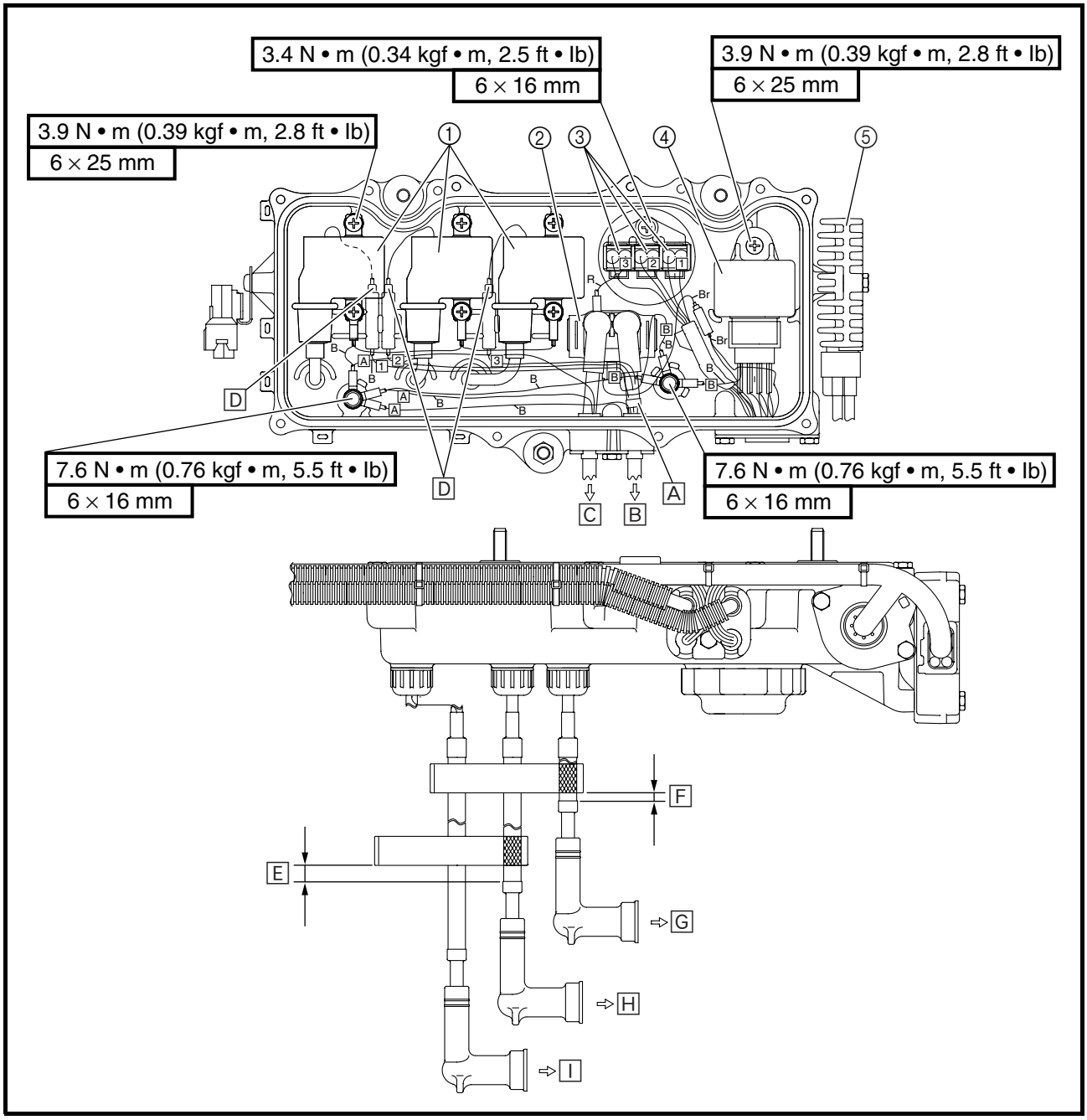
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)
6 × 25 mm
4.9 N • m (0.49 kgf • m, 3.5 ft • lb)
6 × 25 mm

Step	Procedure/Part name	Q'ty	Service points
32	Fuse (20 A)	1	
33	Tapping screw	2	
34	Wire harness	1	
			Reverse the disassembly steps for assembly.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3.9 N • m (0.39 kgf • m, 2.8 ft • lb)
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7.6 N • m (0.76 kgf • m, 5.5 ft • lb)
6 × 16 mm
7.6 N • m (0.76 kgf • m, 5.5 ft • lb)
6 × 16 mm
① ② ③ ④ ⑤
A B C D E F G H I
R Br B

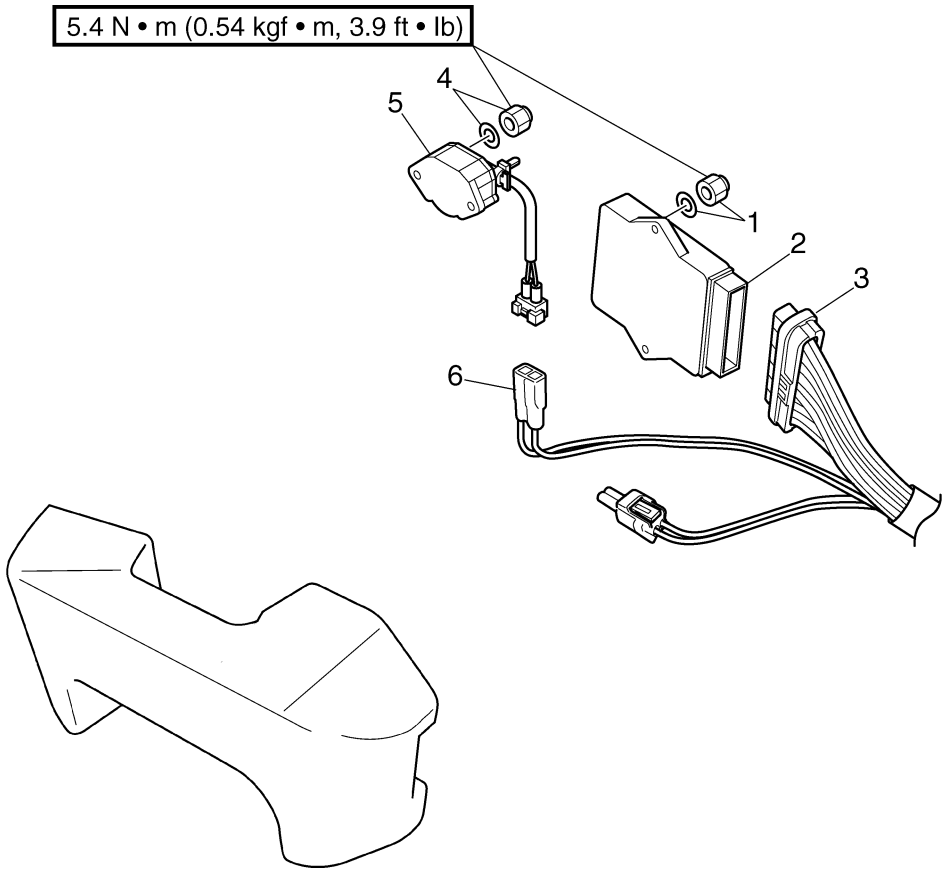
① Ignition coils
② Starter relay
③ Fuse holders
④ Main and fuel pump relay
⑤ Rectifier/regulator

A White tape
B To starter motor
C To positive battery terminal
D Install the ignition coil connectors to the electrical box holders.
E 40–50 mm (1.57–1.97 in)
F 20–30 mm (0.79–1.18 in)
G To cylinder #3
H To cylinder #2
I To cylinder #1

B : Black
Br : Brown
R : Red

ECM AND SLANT DETECTION SWITCH

EXPLODED DIAGRAM



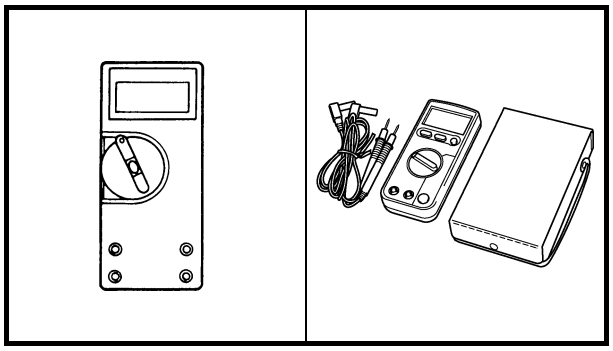
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ECM AND SLANT DETECTION SWITCH REMOVAL		Follow the left "Step" for removal.
1	Nut/washer	2/2	
2	ECM	1	
3	ECM coupler	1	
4	Nut/washer	2/2	
5	Slant detection switch	1	
6	Slant detection switch coupler	1	
			Reverse the removal steps for installation.

ELECTRICAL ANALYSIS
INSPECTION

CAUTION:

- **All measuring instruments should be handled with special care. Damaged or mishandled instruments will not measure properly.**
- **On instruments powered by dry batteries, check the battery voltage periodically and replace the batteries if necessary.**



Digital tester

NOTE:

Throughout this chapter the part numbers of the specified digital testers have been omitted. Refer to the following part numbers.

Digital multimeter:
YU-34899-A
Digital circuit tester:
90890-03174

NOTE:

" ○——○ " indicates a continuity of electricity (i.e., a closed circuit at the respective switch position).

Low resistance measurement

NOTE:

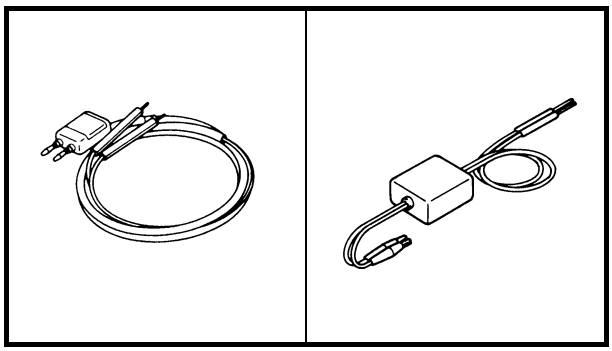
- When measuring a resistance of 10 Ω or less with the digital tester, the correct measurement cannot be obtained because of the tester's internal resistance.
- To obtain the correct value, subtract the internal resistance from the displayed measurement.
- The internal resistance of the tester can be obtained by connecting both of its terminals.

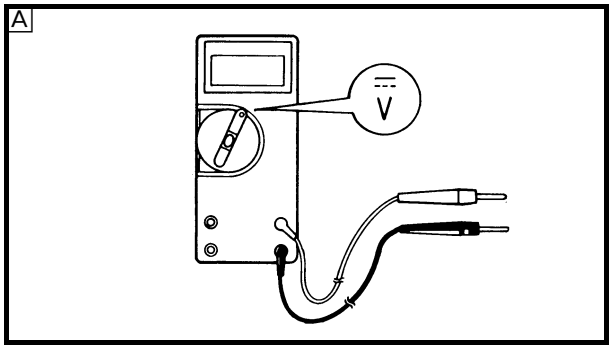
Correct value =
Displayed measurement –
Internal resistance

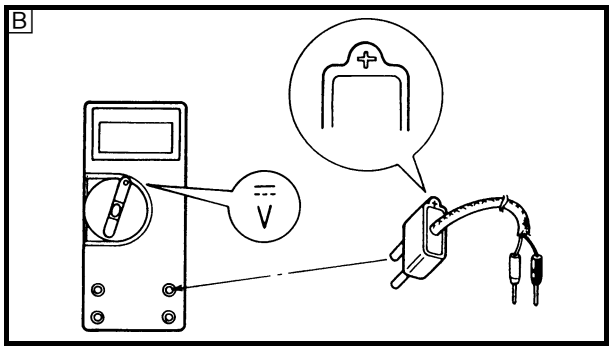
Peak voltage measurement

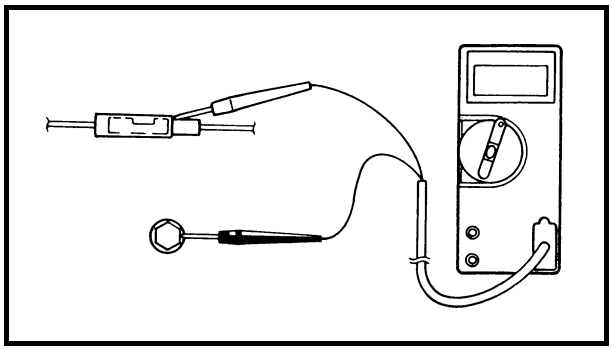
NOTE:

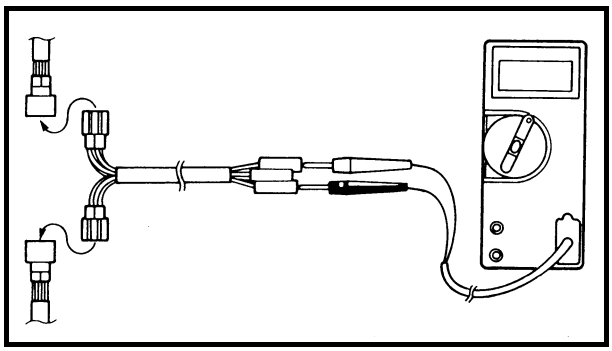
- When checking the condition of the ignition system, it is vital to know the peak voltage.
- Cranking speed is dependant on many factors (e.g., fouled or weak spark plugs, a weak battery). If one of these is defective, the peak voltage will be lower than specification.
- If the peak voltage measurement is not within specification, the engine will not operate properly.
- A low peak voltage will also cause components to wear prematurely.











Peak voltage adapter

NOTE:
- Throughout this chapter the part number of the peak voltage adapters have been omitted. Refer to the following part numbers.
- The peak voltage adapter should be used with the digital tester.

Peak volt meter adapter:
YU-39991
Peak voltage adapter B:
90890-03172

- When measuring the peak voltage, connect the peak voltage adapter to the digital circuit tester and switch the selector to the DC voltage mode.

NOTE:
- Make sure that the adapter leads are properly installed in the digital circuit tester.
- Make sure that the positive pin (the "+" mark facing up as shown) on the adapter is installed into the positive terminal of the tester.
- The test harness is needed for the following tests.

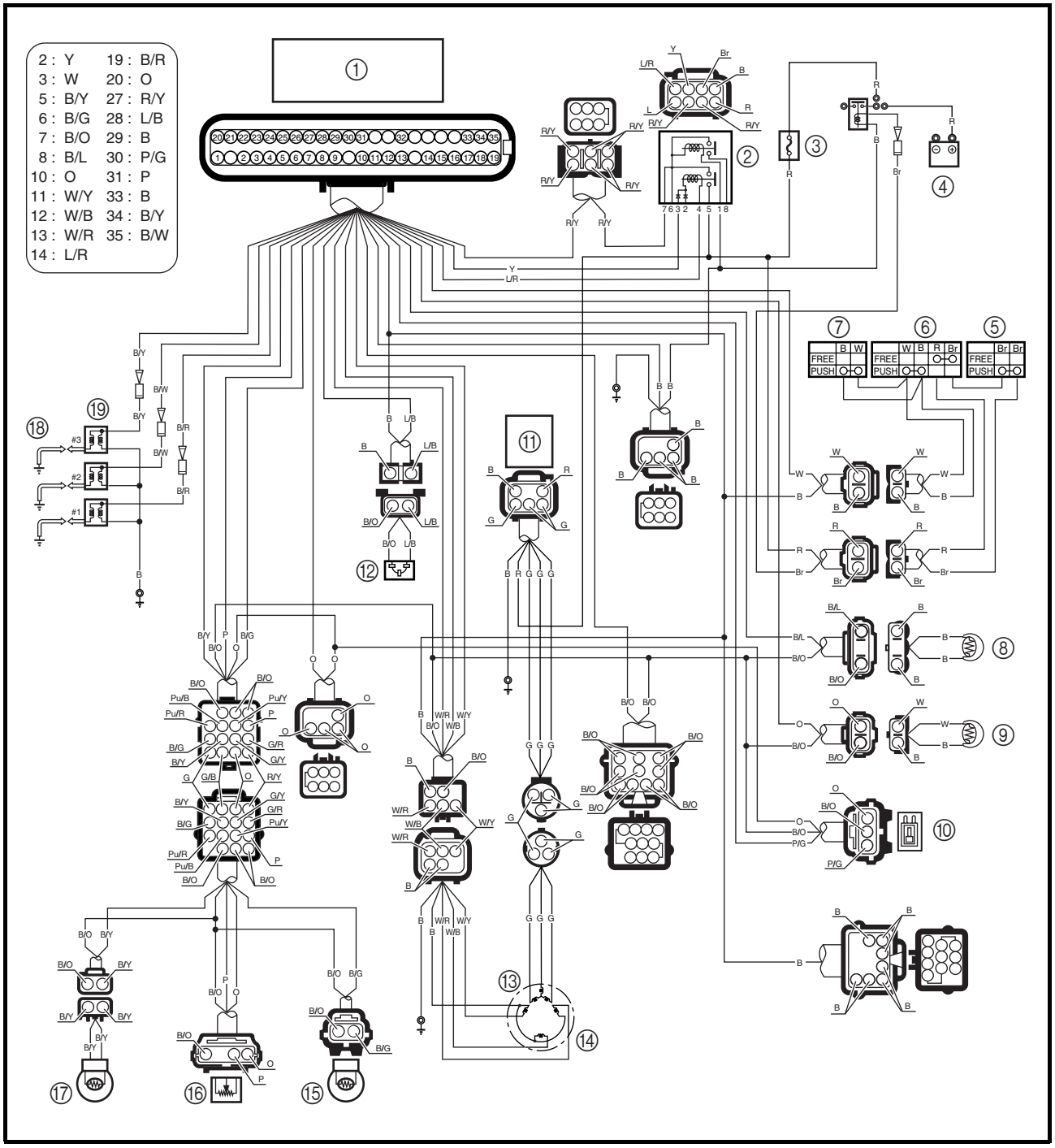
A Voltage measurement
B Peak voltage measurement

Test harness

Checking steps:
- Disconnect the coupler connections.
- Connect the test harness between the couplers.
- Connect the tester terminals to the terminals which are being checked.
- Run the engine and observe the measurement.

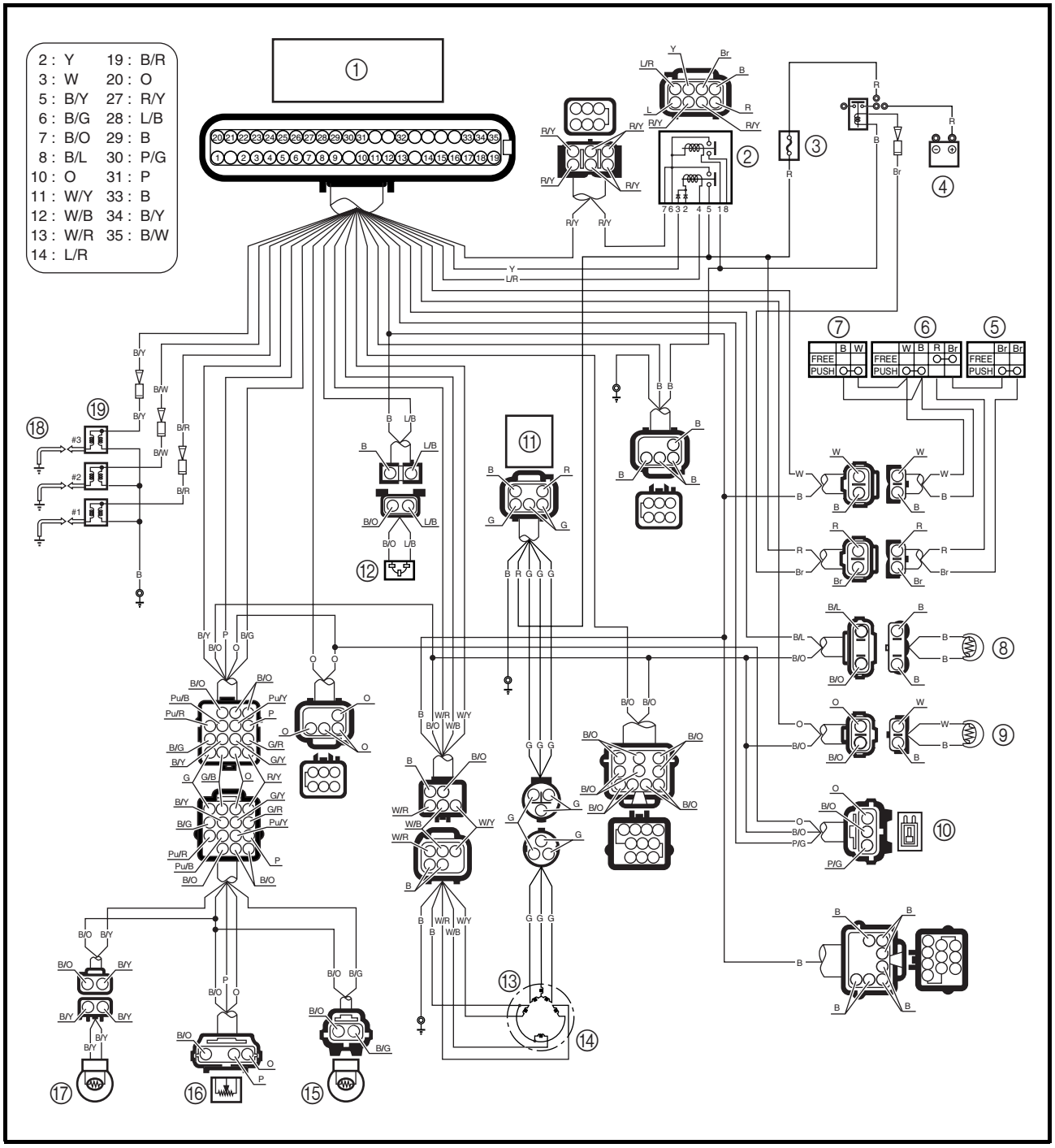
NOTE:
If the lighting coil and pickup coil(s) are measured unloaded, disconnect the test harness from the coupler of the output end.

IGNITION SYSTEM
WIRING DIAGRAM

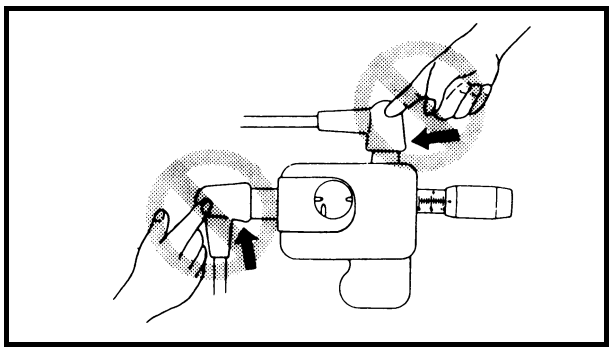


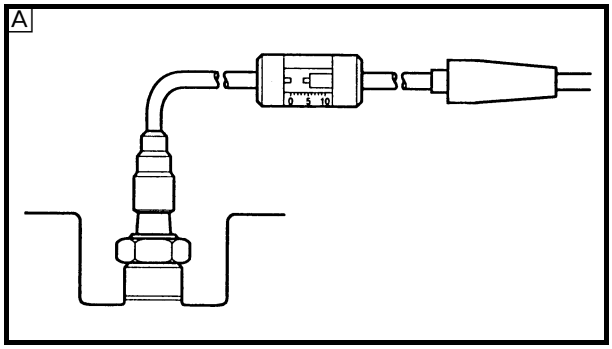
① ECM
② Main and fuel pump relay
③ Fuse (20 A)
④ Battery
⑤ Start switch
⑥ Engine shut-off switch
⑦ Engine stop switch
⑧ Exhaust temperature sensor
⑨ Cooling water temperature sensor
⑩ Intake air temperature sensor
⑪ Rectifier/regulator
⑫ Slant detection switch
⑬ Lighting coil
⑭ Pickup coil
⑮ Atmospheric pressure sensor
⑯ Throttle position sensor
⑰ Engine temperature sensor
⑱ Spark plugs
⑲ Ignition coils

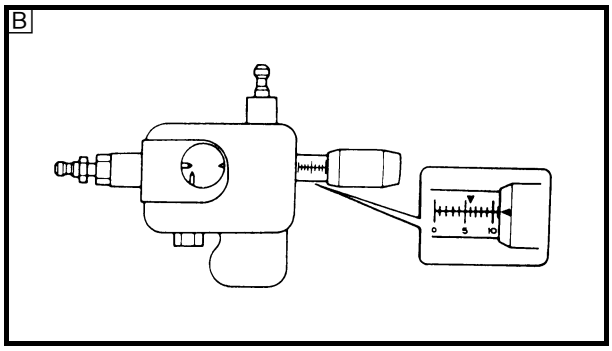
WIRING DIAGRAM

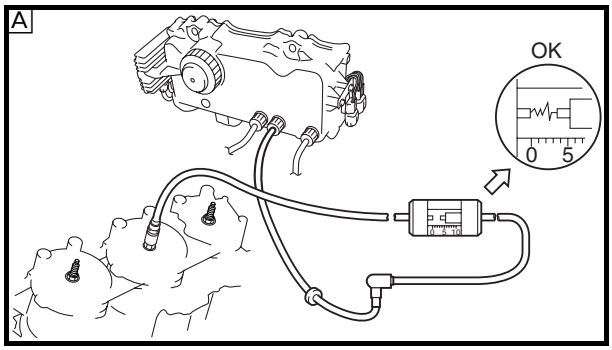


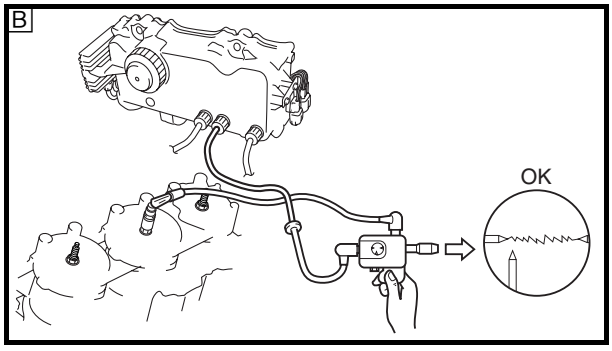
B : Black
Br : Brown
G : Green
O : Orange
P : Pink
R : Red
W : White
Y : Yellow
B/G : Black/green
B/L : Black/blue
B/O : Black/orange
B/R : Black/red
B/W : Black/white
B/Y : Black/yellow
L/B : Blue/black
L/R : Blue/red
P/G : Pink/green
R/Y : Red/yellow
W/B : White/black
W/R : White/red
W/Y : White/yellow











IGNITION SPARK GAP

⚠ WARNING

- **When checking the spark gap, do not touch any of the connections of the spark gap tester lead wires.**
- **When performing the spark gap test, take special care not to let sparks leak out of the removed spark plug cap.**
- **When performing the spark gap check, keep flammable gas or liquids away, since this test can produce sparks.**

1. Check:
   - Ignition spark gap
     Below specification → Check the ECM output peak voltage.
     Check the ignition coil for resistance.

Spark gap:
10–11 mm (0.39–0.43 in)

Checking steps:
- Connect the spark plug cap to the spark gap tester.
- Set the spark gap length on the adjusting knob.

Spark gap tester:
YM-34487
Ignition tester:
90890-06754

- Crank the engine and observe the ignition system spark through the discharge window.

A For USA and Canada
B For Worldwide

IGNITION SYSTEM PEAK VOLTAGE

⚠ WARNING

When checking the electrical components, do not touch any of the connections of the digital tester lead wires.

NOTE:

- If there is no spark, or the spark is weak, continue with the ignition system test.
- If a good spark is obtained, the problem is not with the ignition system, but possibly with the spark plug(s) or another component.

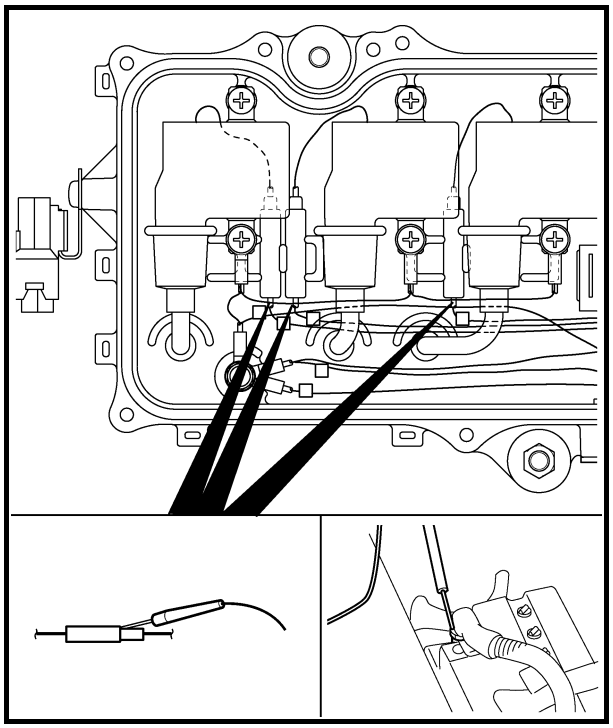
1. Measure:
   - ECM output peak voltage
     Below specification → Measure the pickup coil output peak voltage.

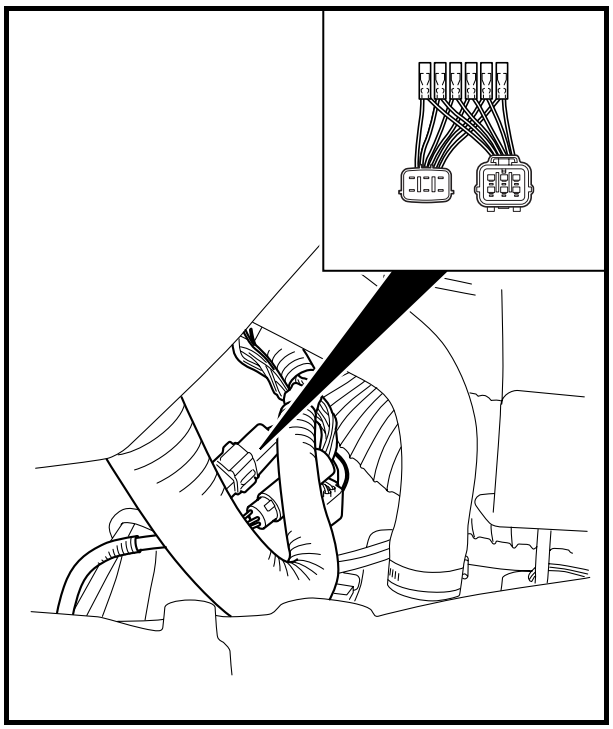
ECM output peak voltage:
Black/red (B/R) – Ground for cylinder #1
Black/white (B/W) – Ground for cylinder #2
Black/yellow (B/Y) – Ground for cylinder #3

r/min	Loaded		
	Cranking	2,000	3,500
V	0.8	174	156

NOTE:

To crank the engine, connect the engine shut-off cord (lanyard) to the engine shut-off switch, and then press the start switch and engine stop switch simultaneously.





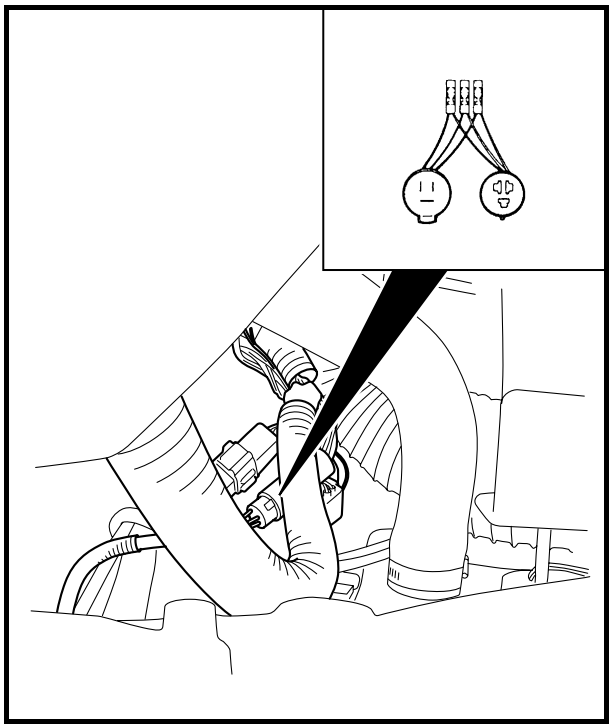
2. Measure:
   - Pickup coil output peak voltage
     Below specification → Replace the pickup coil.
     Above specification → Replace the ECM.

Test harness (6 pins):
YB-06849
Test harness SM6195021-6 (6 pins):
90890-06849

Pickup coil output peak voltage:
White/red (W/R) – Black (B)
White/black (W/B) – Black (B)
White/yellow (W/Y) – Black (B)

r/min	Unloaded	Loaded		
	Cranking		2,000	3,500
V	6.0	6.0	24	40

NOTE:
To crank the engine, connect the engine shut-off cord (lanyard) to the engine shut-off switch, and then press the start switch and engine stop switch simultaneously.



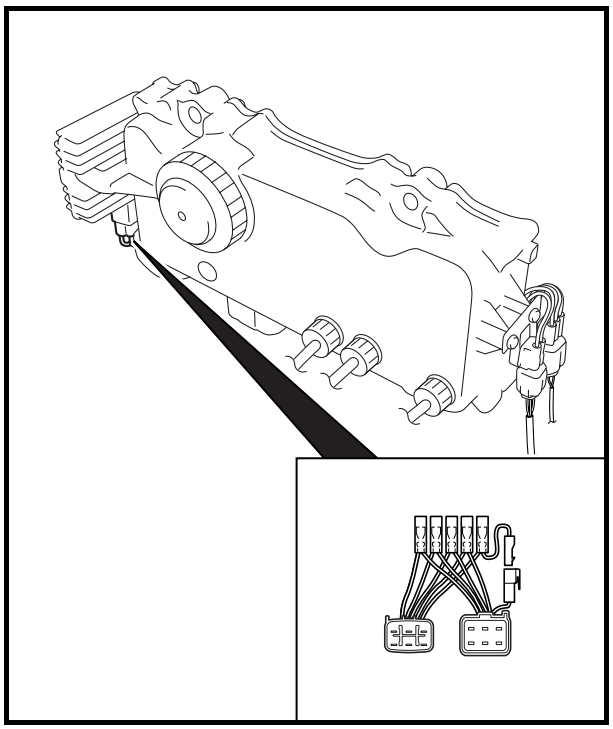
3. Measure:
   - Lighting coil output peak voltage
     Below specification → Replace the lighting coil.

Lighting coil tester (3 pins):
YB-06870
Test harness SMT250-3 (3 pins):
90890-06870

Lighting coil output peak voltage:
Green (G) – Green (G)

r/min	Unloaded	Loaded		
	Cranking		2,000	3,500
V	9.0	7.5	12.5	12.5

NOTE:
To crank the engine, connect the engine shut-off cord (lanyard) to the engine shut-off switch, and then press the start switch and engine stop switch simultaneously.



4. Measure:
   • Rectifier/regulator output peak voltage
   Below specification → Replace the rectifier/regulator.

Test harness (6 pins):
YB-06848
Test harness FSW-6A (6 pins):
90890-06848

Rectifier/regulator output peak voltage:
Red (R) – Black (B)

r/min	Unloaded
	3,500
V	14.5

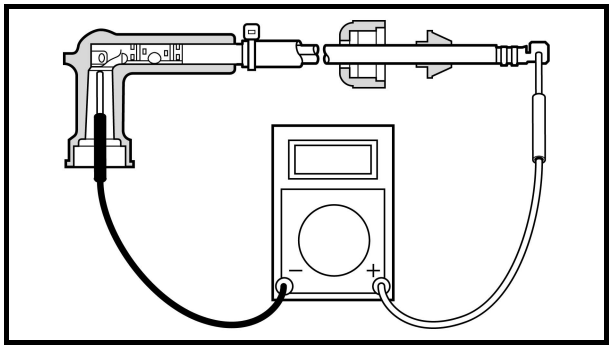
NOTE:
- Do not use the peak voltage adapter to measure the output voltage.
- Disconnect the output lead of the tester harness.

BATTERY
Refer to “ELECTRICAL” in Chapter 3.

FUSE
Refer to “STARTING SYSTEM.”

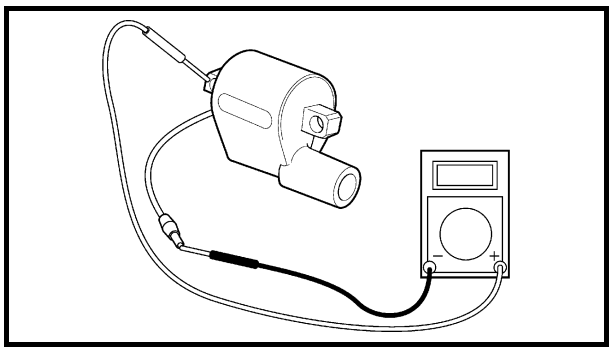
SPARK PLUGS
Refer to “POWER UNIT” in Chapter 3.

SPARK PLUG LEAD ASSEMBLY
1. Check:
   • Spark plug lead assembly
   Cracks/damage → Replace.



2. Measure:
   • Spark plug lead resistance
   Out of specification → Replace.

Spark plug lead resistance:
#1: 6.1–14.3 kΩ
#2: 4.5–10.9 kΩ
#3: 3.3–8.2 kΩ

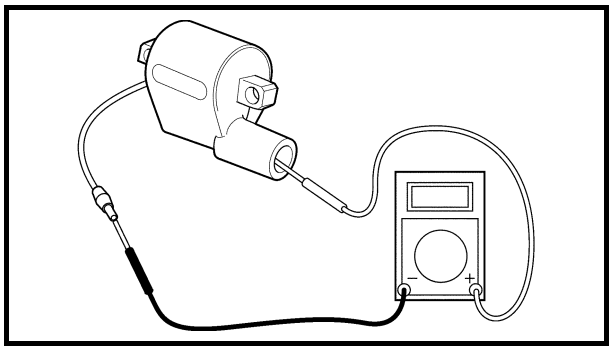


IGNITION COIL

1. Measure:
   - Primary coil resistance
     Out of specification → Replace.

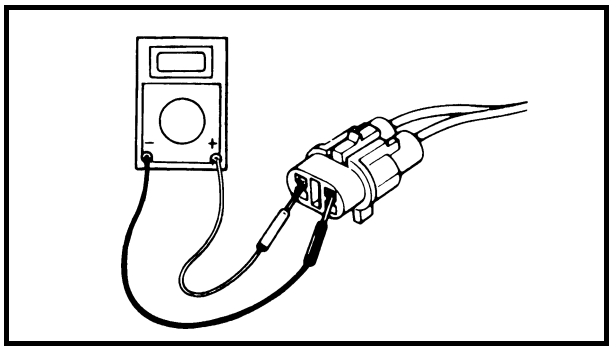
Primary coil resistance:
Black/white (B/W) – Body
0.26–0.36 Ω at 20 °C (68 °F)

NOTE:
When measuring a resistance of 10 Ω or less with the digital tester, the correct measurement cannot be obtained because of the tester's internal resistance.
Refer to "Low resistance measurement."



2. Measure:
   - Secondary coil resistance
     Out of specification → Replace.

Secondary coil resistance:
Black/white (B/W) – Spark plug lead terminal
3.5–4.7 kΩ at 20 °C (68 °F)

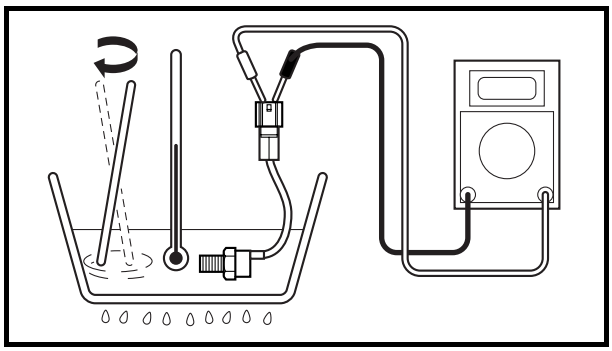


ENGINE STOP SWITCH

1. Check:
   - Engine stop switch continuity
     Out of specification → Replace.

Engine stop switch continuity (black coupler)

Clip	Position	Lead color	
		White	Black
Installed	Free		
	Push	○——	——○
Removed	Free	○——	——○
	Push	○——	——○

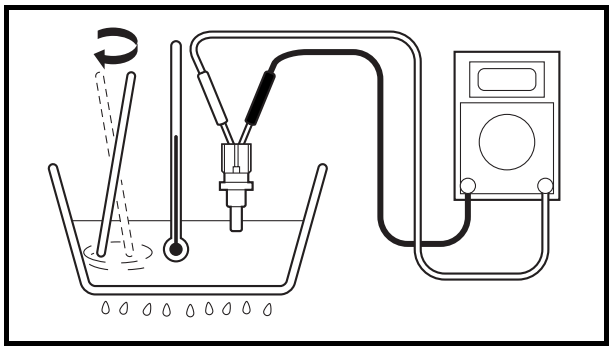


ENGINE TEMPERATURE SENSOR

1. Measure:
   - Engine temperature sensor resistance (at the specified temperatures)
     Out of specifications → Replace.

Engine temperature sensor resistance:
20 °C (68 °F): 54.2–69.0 kΩ
100 °C (212 °F): 3.12–3.48 kΩ

Measurement steps:
- Suspend the engine temperature sensor in a container filled with water.
- Slowly heat the water.
- Measure the resistance when the specified temperatures are reached.

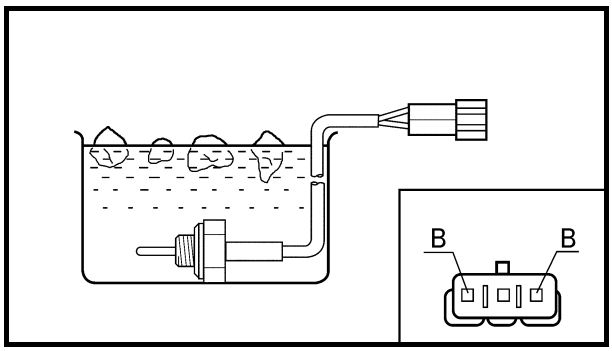


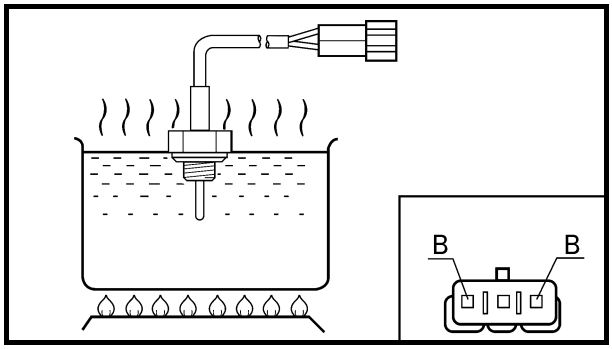
INTAKE AIR TEMPERATURE SENSOR

1. Measure:
   - Intake air temperature sensor resistance (at the specified temperatures)
     Out of specifications → Replace.

Intake air temperature sensor resistance:
0 °C (32 °F): 5.4–6.6 kΩ
80 °C (176 °F): 0.29–0.39 kΩ

Measurement steps:
- Ice the intake air temperature sensor and measure the resistance when the specified temperature is reached.
- Suspend the intake air temperature sensor in a container filled with water.
- Slowly heat the water.
- Measure the resistance when the specified temperature is reached.



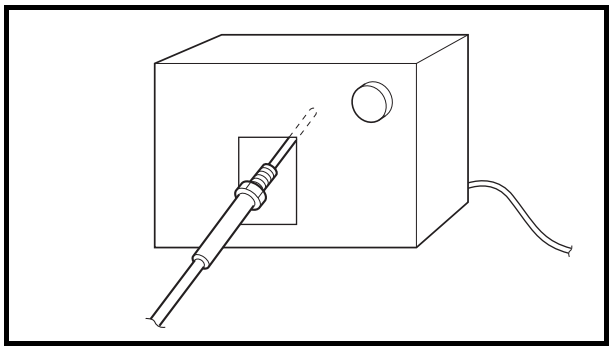


COOLING WATER TEMPERATURE SENSOR

1. Measure:
   - Cooling water temperature sensor resistance
     (at the specified temperatures)
     Out of specifications → Replace.

Cooling water temperature sensor resistance:
0 °C (32 °F): 24.0–37.1 kΩ
100 °C (212 °F): 0.87–1.18 kΩ
200 °C (392 °F): 104–153 Ω

Measurement steps:
- Ice the cooling water temperature sensor and measure the resistance when the specified temperature is reached.
- Suspend the cooling water temperature sensor in a container filled with oil.
- Slowly heat the oil.
- Measure the resistance when the specified temperatures are reached.

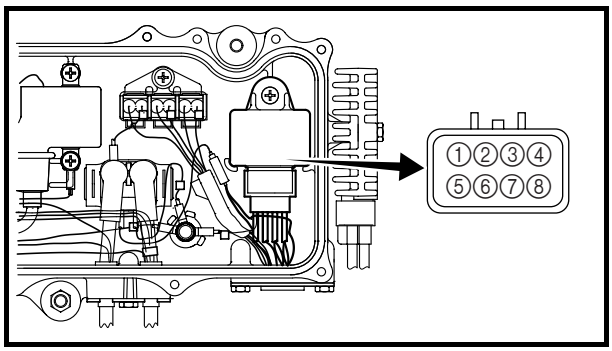


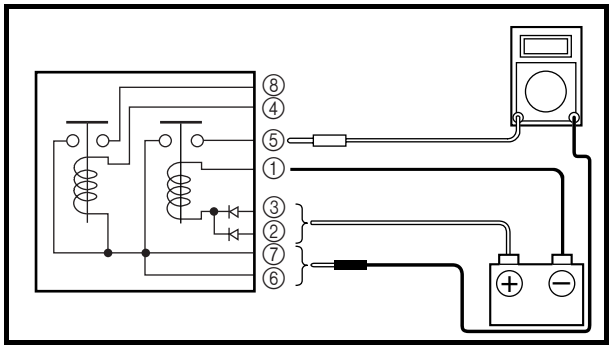
EXHAUST TEMPERATURE SENSOR

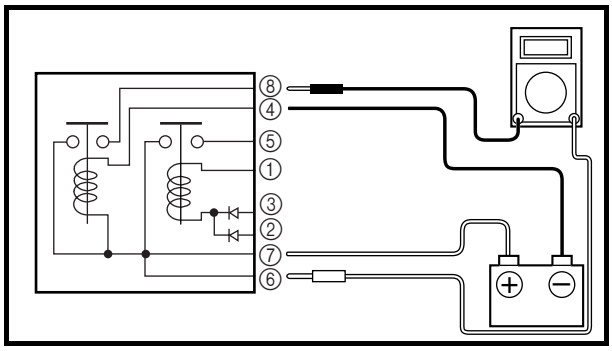
1. Measure:
   - Exhaust temperature sensor resistance
     (at the specified temperatures)
     Out of specifications → Replace.

Exhaust temperature sensor resistance:
300 °C (572 °F): 73–241 kΩ
600 °C (1,112 °F): 0.86–1.58 kΩ
900 °C (1,652 °F): 64–90 Ω

Measurement steps:
- Heat the exhaust temperature sensor using an electric furnace or equivalent.
- Measure the resistance when the specified temperatures are reached.







MAIN AND FUEL PUMP RELAY

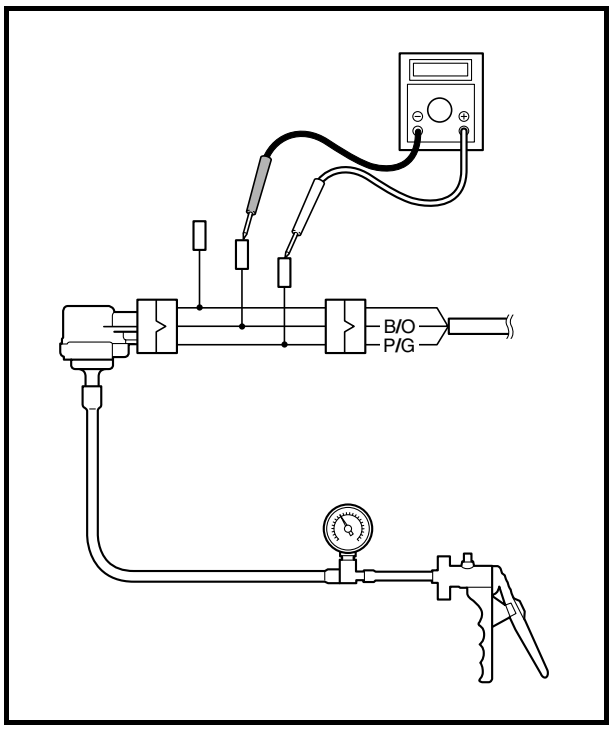
1. Check:
   - Main and fuel pump relay continuity
     Out of specification → Replace.

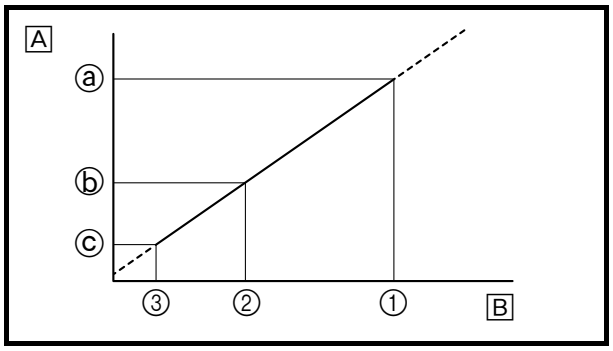
Checking steps:
- Connect the tester leads between main and fuel pump relay terminals ⑤, ⑥, and ⑦.
- Connect terminal ② or ③ to the positive battery terminal.
- Connect terminal ① to the negative battery terminal.
- Check that there is continuity between the main and fuel pump relay terminals.
- Check that there is no continuity between the main and fuel pump relay terminals after disconnecting terminal ①, ②, or ③.
- Connect the tester leads between main and fuel pump relay terminals ⑥ and ⑧.
- Connect terminal ⑦ to the positive battery terminal.
- Connect terminal ④ to the negative battery terminal.
- Check that there is continuity between the main and fuel pump relay terminals.
- Check that there is no continuity between the main and fuel pump relay terminals after disconnecting terminal ④ or ⑦.

THROTTLE POSITION SENSOR

1. Measure:
   - Check the throttle position sensor output voltage using the Yamaha Diagnostic System.
     Out of specification → Replace the throttle bodies.

Throttle position sensor output voltage:
Pink (P) – Black/orange (B/O)
0.793–0.807 V





ATMOSPHERIC PRESSURE SENSOR

1. Measure:
   - Atmospheric pressure sensor output voltage
     Out of specification → Replace.

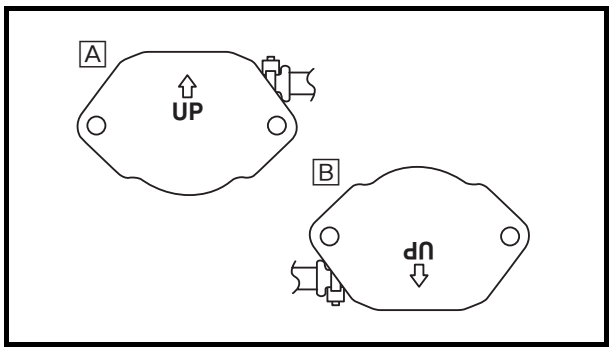
Air pressure sensor tester (3 pins):
YB-06869
Test harness EJ-II-3 (3 pins):
90890-06869
Lower unit pressure/vacuum tester:
YB-35956-A
Vacuum/pressure pump gauge set:
90890-06756

Atmospheric pressure sensor output voltage:
Pink/green (P/G) – Black/orange (B/O)
① 101.3 kPa (1.01 kgf/cm², 14.4 psi):
ⓐ 4.00 V
② 50 kPa (0.5 kgf/cm², 7.1 psi):
ⓑ 1.97 V
③ 20 kPa (0.2 kgf/cm², 2.8 psi):
ⓒ 0.79 V

A: Output voltage B: Vacuum pressure

Measurement steps:
- Disconnect the atmospheric pressure sensor.
- Connect the test harness (3 pins) to the atmospheric pressure sensor.
- Operate the Yamaha Diagnostic System.
- Apply vacuum pressure to the atmospheric pressure sensor and measure the output voltage.

NOTE:
While the Yamaha Diagnostic System is operating, electric power is supplied to the atmospheric pressure sensor.



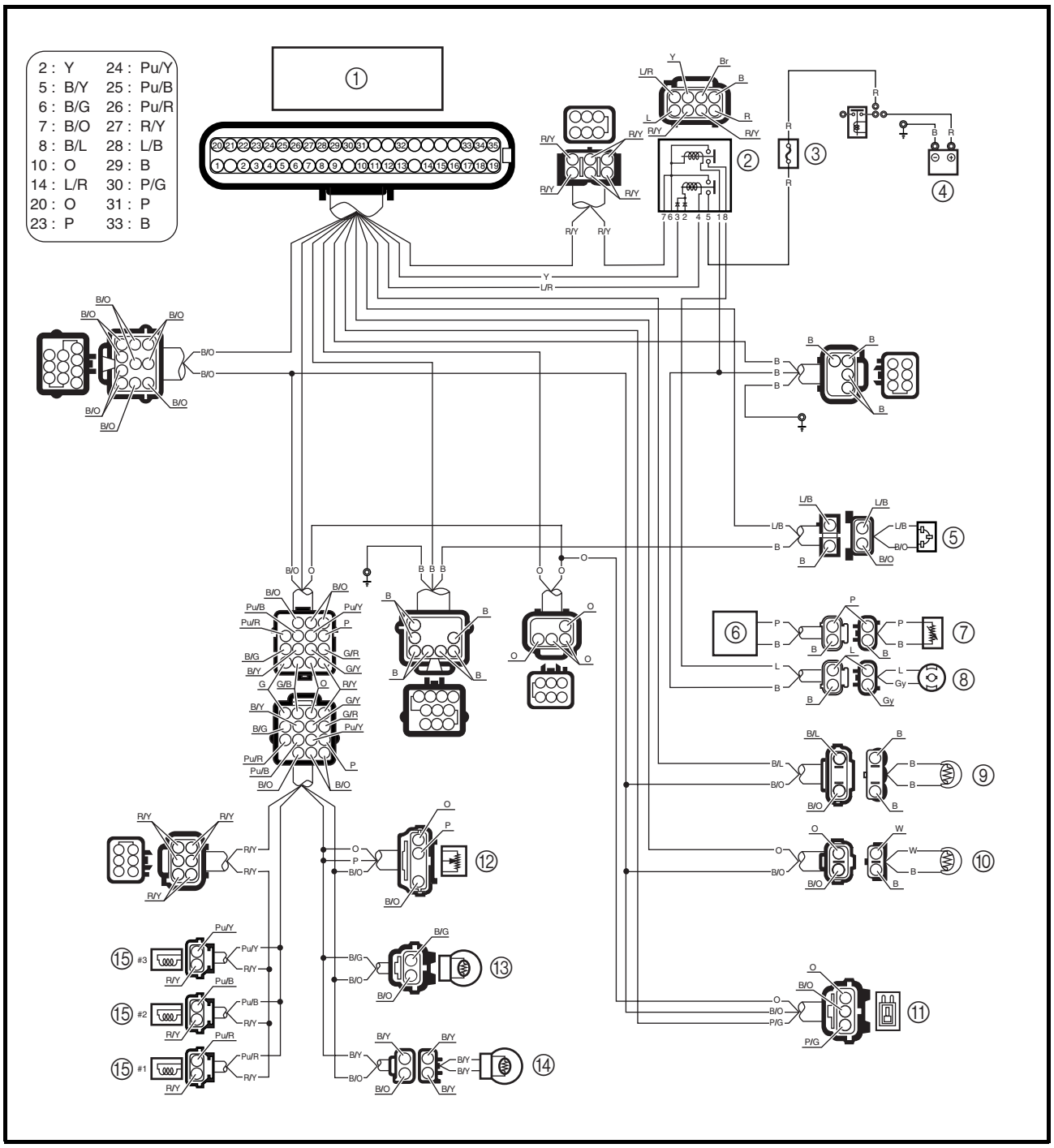
SLANT DETECTION SWITCH

1. Check:
   - Slant detection switch continuity
     Out of specification → Replace.

Position	Lead color	
	Blue/black (L/B)	Black/ orange (B/O)
Normal operation A		
Overturned B	○———	———○

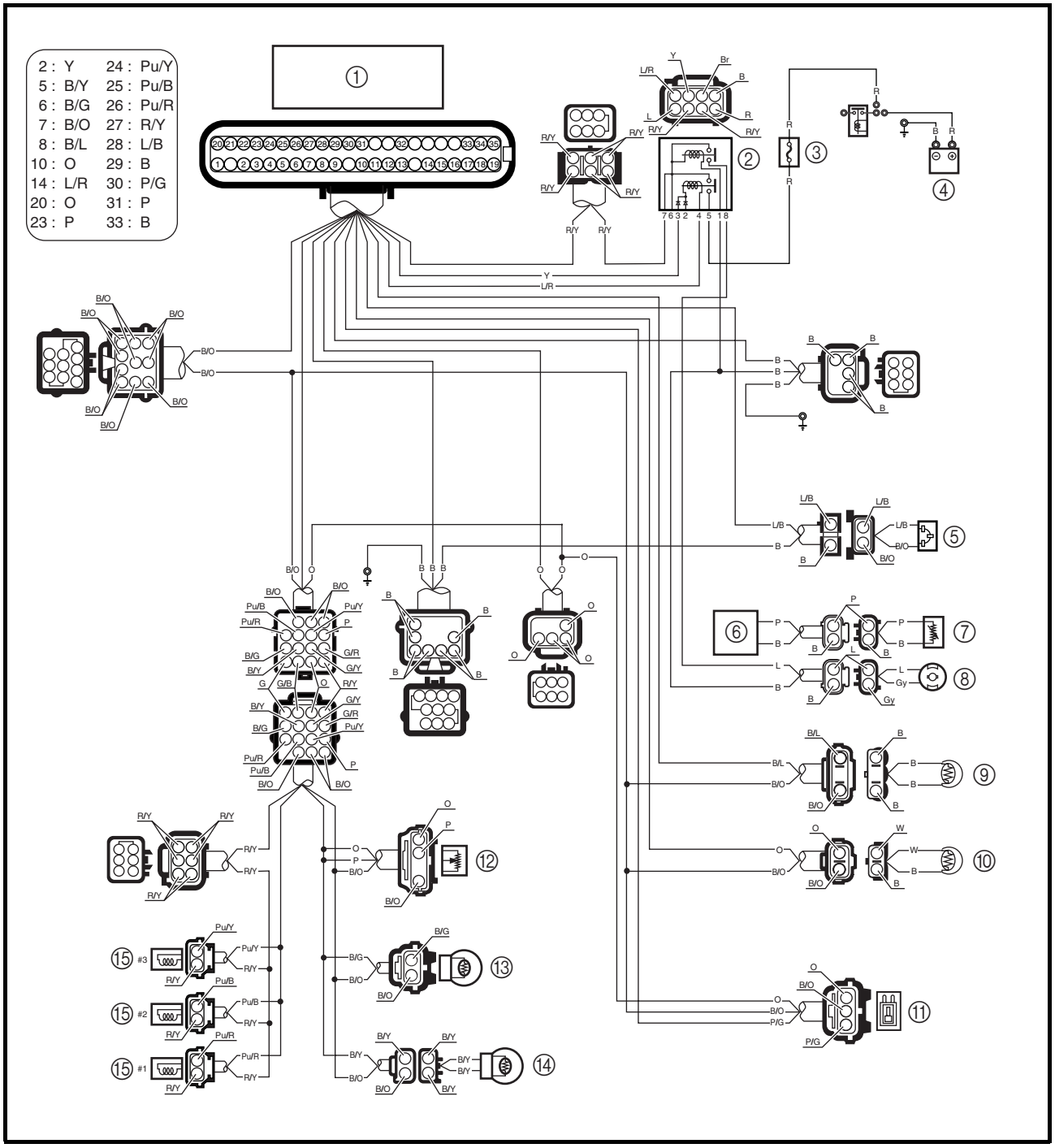
FUEL CONTROL SYSTEM

WIRING DIAGRAM

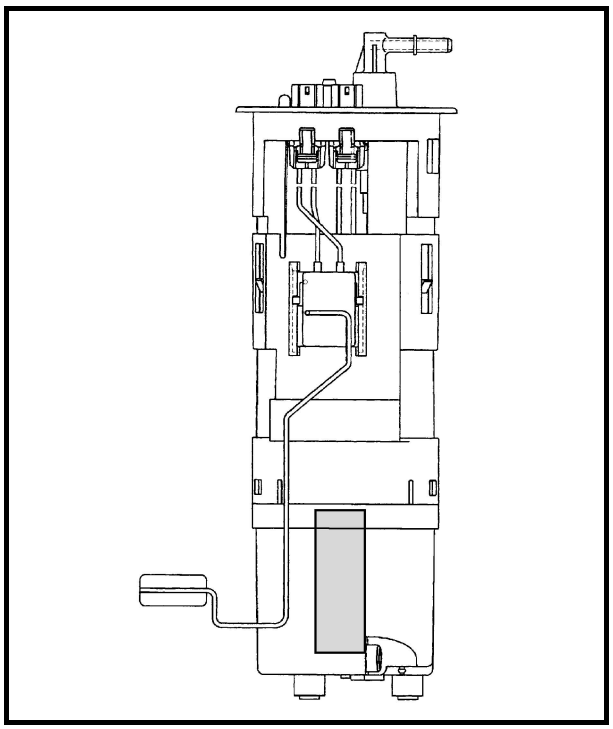


① ECM
② Main and fuel pump relay
③ Fuse (20 A)
④ Battery
⑤ Slant detection switch
⑥ Multifunction meter
⑦ Fuel sender
⑧ Fuel pump
⑨ Cooling water temperature sensor
⑩ Exhaust temperature sensor
⑪ Atmospheric pressure sensor
⑫ Throttle position sensor
⑬ Intake air temperature sensor
⑭ Engine temperature sensor
⑮ Fuel injector

WIRING DIAGRAM

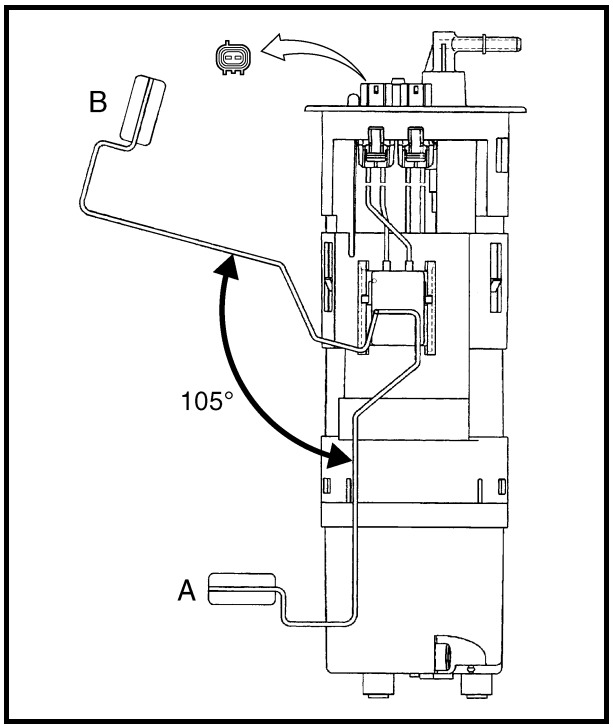


B	: Black	B/G	: Black/green	Pu/R	: Purple/red
Gy	: Gray	B/L	: Black/blue	Pu/Y	: Purple/yellow
L	: Blue	B/O	: Black/orange	R/Y	: Red/yellow
O	: Orange	B/Y	: Black/yellow		
P	: Pink	L/B	: Blue/black		
R	: Red	L/R	: Blue/red		
W	: White	P/G	: Pink/green		
Y	: Yellow	Pu/B	: Purple/black		



FUEL PUMP

1. Check:
   - Fuel pump operating sound
     No sound → Measure the fuel pressure. Refer to "FUEL INJECTION SYSTEM" in Chapter 4.



FUEL SENDER

1. Measure:
   - Fuel sender resistance
     Out of specification → Replace.

Float position	Resistance (Ω)
A	133.5–136.5
B	5–7

FUEL INJECTOR
Refer to “FUEL INJECTION SYSTEM” in Chapter 4.

ENGINE TEMPERATURE SENSOR
Refer to “IGNITION SYSTEM.”

INTAKE AIR TEMPERATURE SENSOR
Refer to “IGNITION SYSTEM.”

COOLING WATER TEMPERATURE SENSOR
Refer to “IGNITION SYSTEM.”

EXHAUST TEMPERATURE SENSOR
Refer to “IGNITION SYSTEM.”

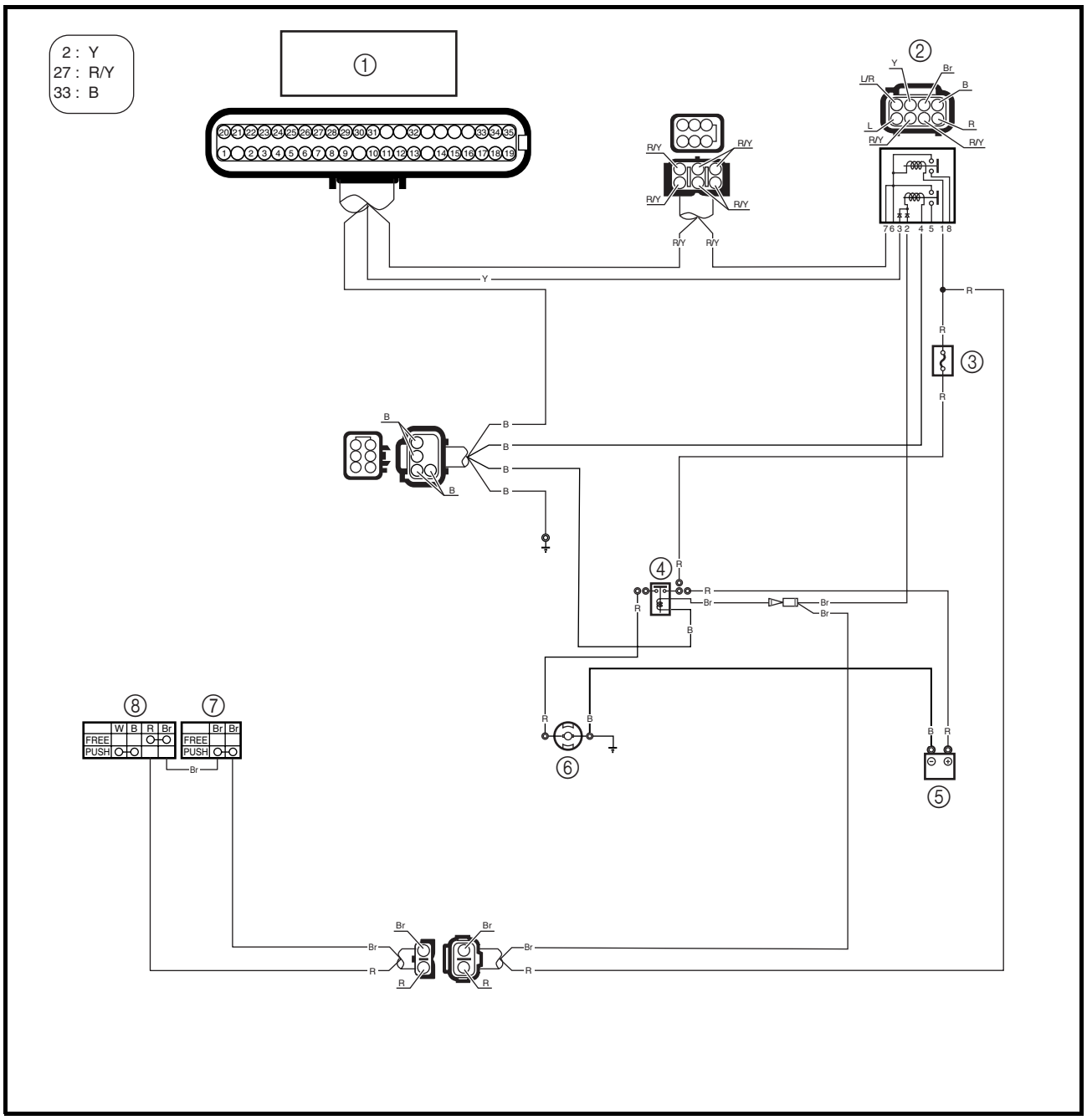
MAIN AND FUEL PUMP RELAY
Refer to “IGNITION SYSTEM.”

THROTTLE POSITION SENSOR
Refer to “IGNITION SYSTEM.”

ATMOSPHERIC PRESSURE SENSOR
Refer to “IGNITION SYSTEM.”

SLANT DETECTION SWITCH
Refer to “IGNITION SYSTEM.”

STARTING SYSTEM
WIRING DIAGRAM



① ECM
② Main and fuel pump relay
③ Fuse (20 A)
④ Starter relay
⑤ Battery
⑥ Starter motor
⑦ Start switch
⑧ Engine shut-off switch

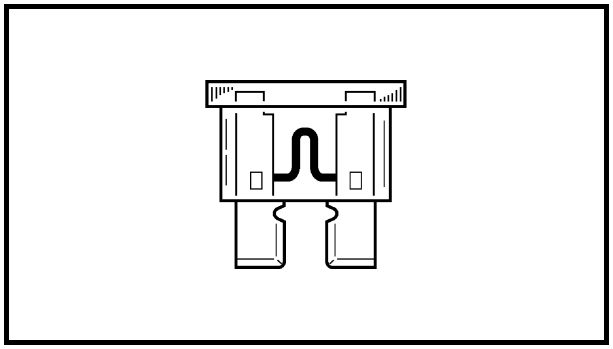
B : Black
Br : Brown
R : Red
Y : Yellow
R/Y : Red/yellow

BATTERY

Refer to “ELECTRICAL” in Chapter 3.

WIRING CONNECTIONS

1. Check:
   - Wiring connections
     Poor connections → Properly connect.

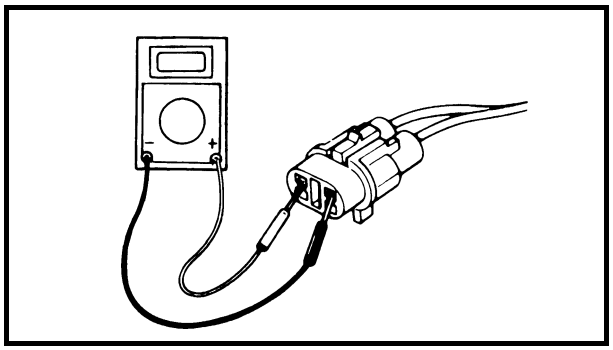


FUSES

1. Check:
   - Fuses
     Broken → Replace.

Fuse rating:
20 A × 1, 3 A × 2

NOTE:
The 20 A fuse is for the main relay, engine shut-off switch, and rectifier/regulator.
The 3 A fuses are for the multifunction meter and electric bilge pump.



START SWITCH

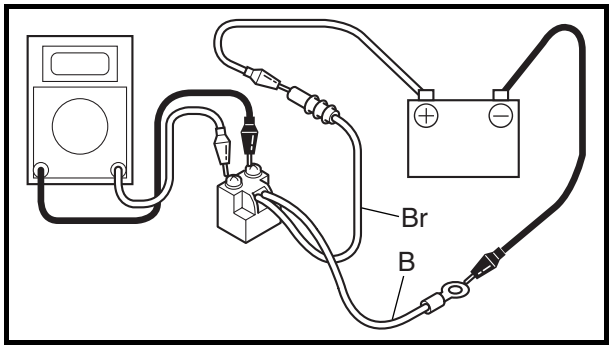
1. Check:
   - Continuity
     Out of specification → Replace.

Start continuity (natural color coupler)

Clip	Position	Leads	
		Red	Brown
Installed	Free		
	Push	○	○
Removed	Free		
	Push		

STARTER RELAY

1. Check:
   - Brown lead terminal
   - Black lead terminal
   Loose → Tighten.



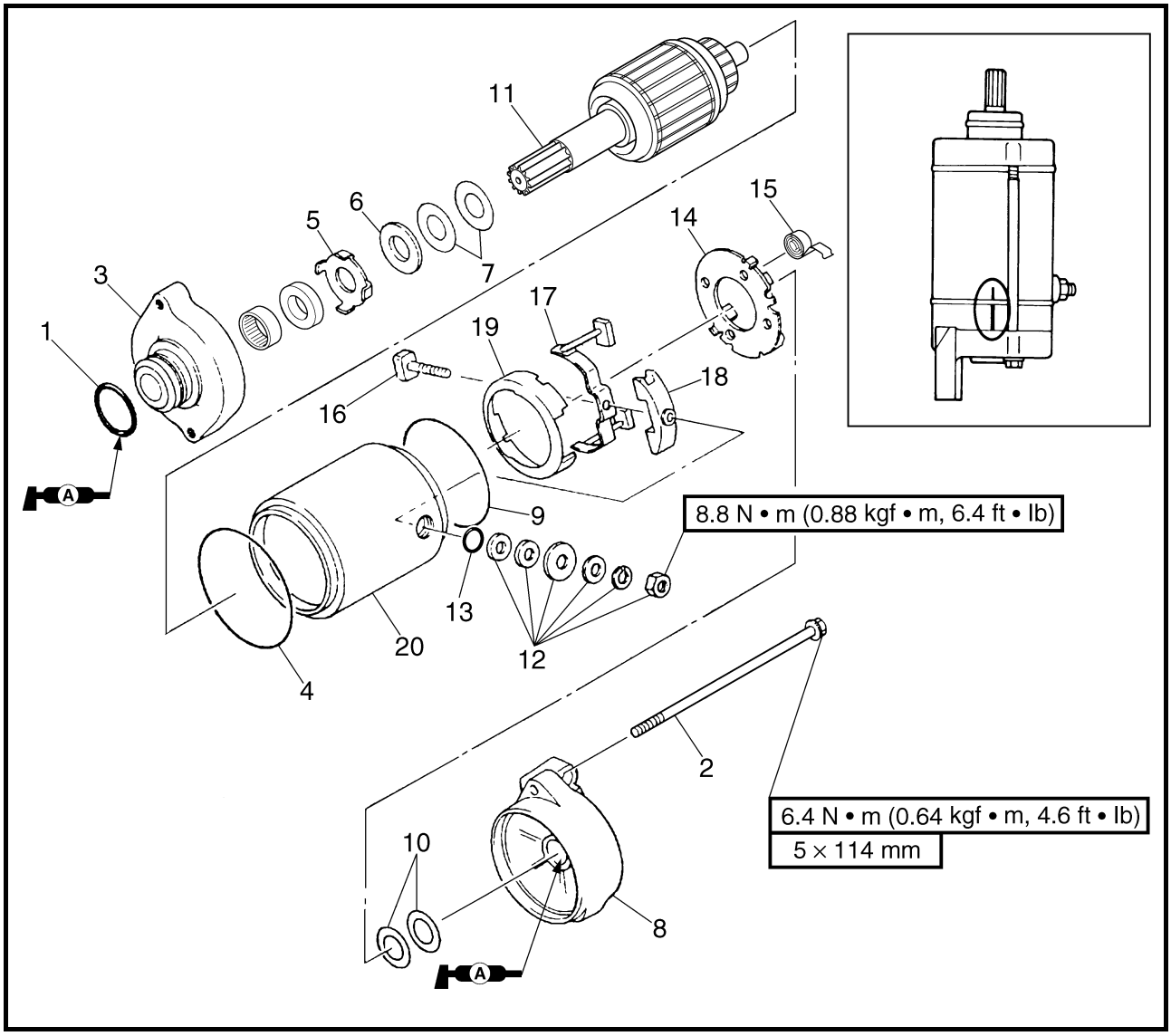
2. Check:
   - Starter relay continuity
   Out of specification → Replace.

Checking steps:
- Connect the tester leads between the starter relay terminals as shown.
- Connect the brown lead terminal to the positive battery terminal.
- Connect the black lead terminal to the negative battery terminal.
- Check that there is continuity between the starter relay terminals.
- Check that there is no continuity after disconnecting the brown or black lead.

MAIN AND FUEL PUMP RELAY

Refer to “IGNITION SYSTEM.”

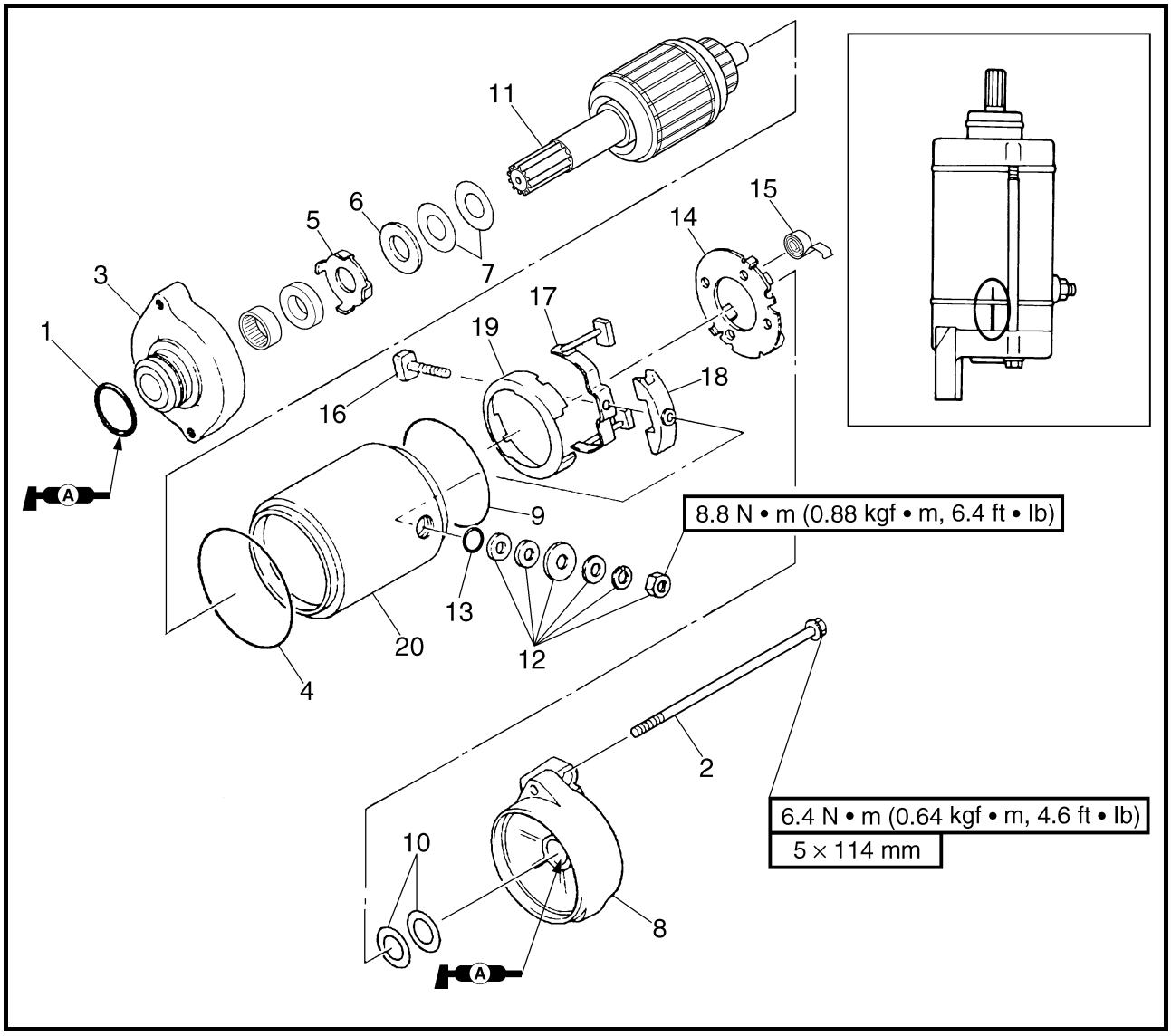
STARTER MOTOR
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

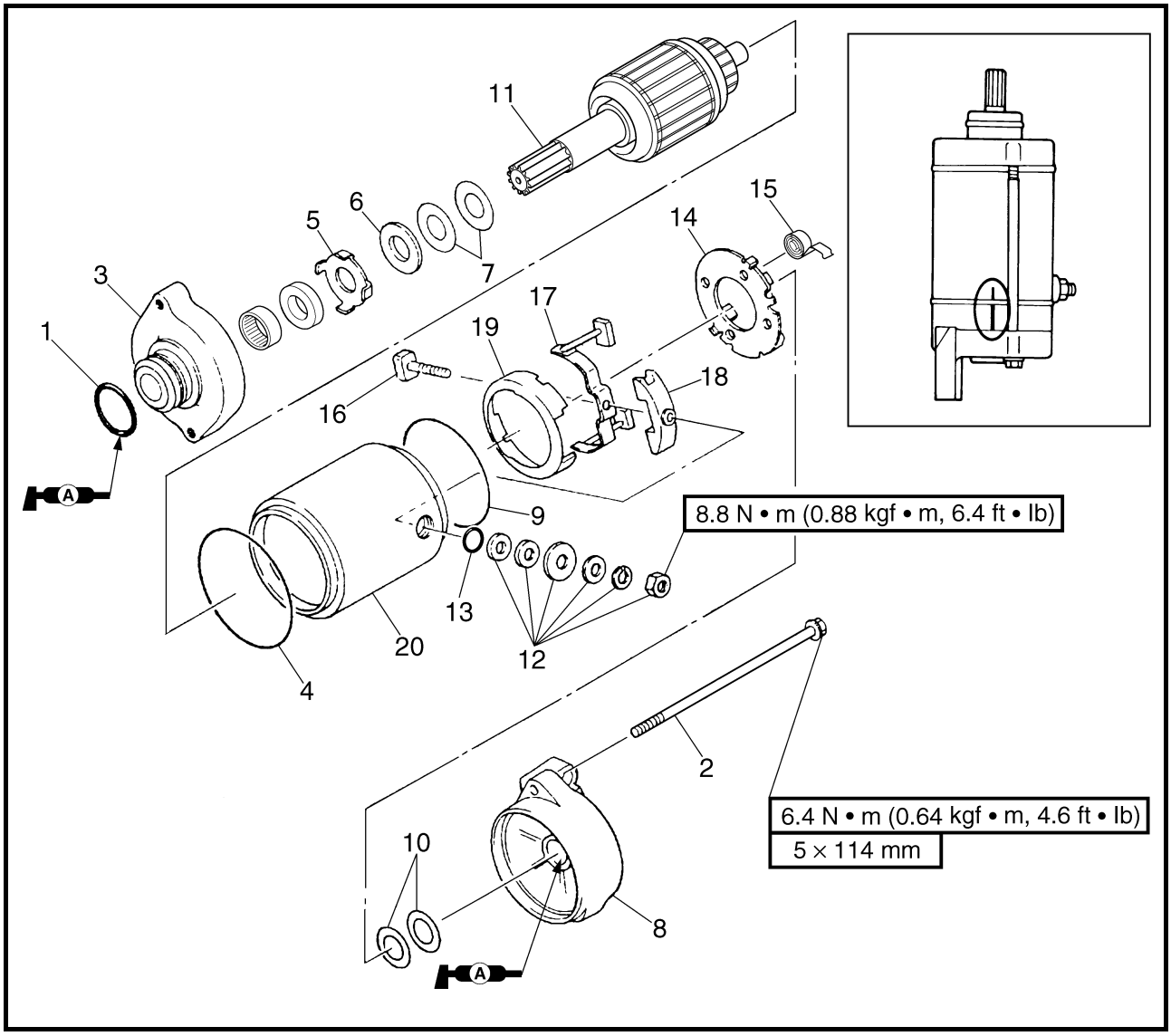
Step	Procedure/Part name	Q'ty	Service points
	STARTER MOTOR DISASSEMBLY		Follow the left "Step" for disassembly.
	Starter motor		Refer to "GENERATOR AND STARTER MOTOR" in Chapter 5.
1	O-ring	1	**Not reusable**
2	Bolt	2	
3	Starter motor front cover	1	
4	O-ring	1	**Not reusable**
5	Oil seal retainer	1	
6	Washer	1	
7	Shim	—	As required Thickness = 0.2 mm, 0.5 mm

EXPLODED DIAGRAM

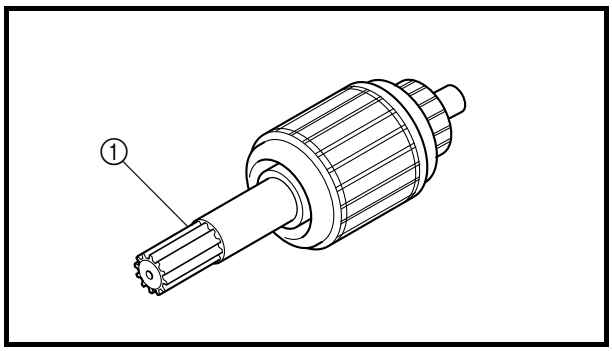


Step	Procedure/Part name	Q'ty	Service points
8	Starter motor rear cover	1	
9	O-ring	1	**Not reusable**
10	Shim	—	As required Thickness = 0.2 mm, 0.8 mm
11	Armature assembly	1	
12	Nut/spring washer/washer	1/1/4	
13	O-ring	1	**Not reusable**
14	Brush holder	1	
15	Brush spring	4	
16	Bolt	1	
17	Brush assembly	1	

EXPLODED DIAGRAM



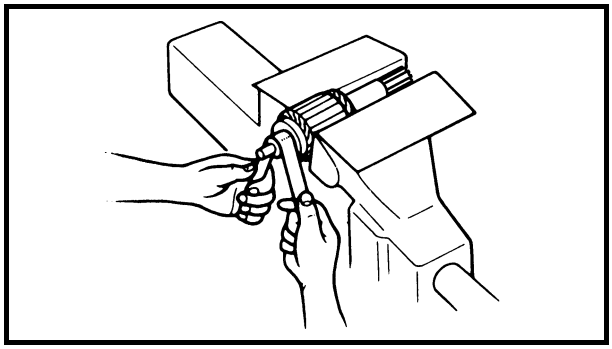
Step	Procedure/Part name	Q'ty	Service points
18	Spacer	1	
19	Holder	1	
20	Starter motor yoke	1	
			Reverse the disassembly steps for assembly.



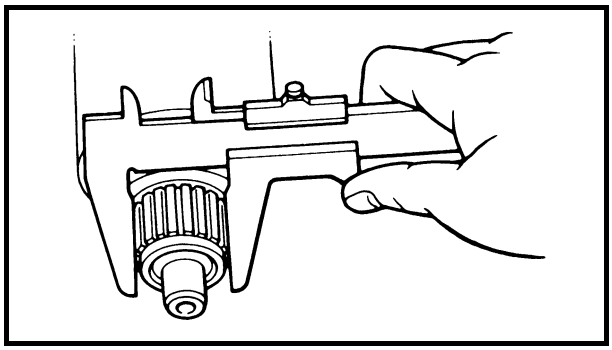
SERVICE POINTS

Armature inspection

1. Check:
   - Armature shaft ①
     Damage/wear → Replace.

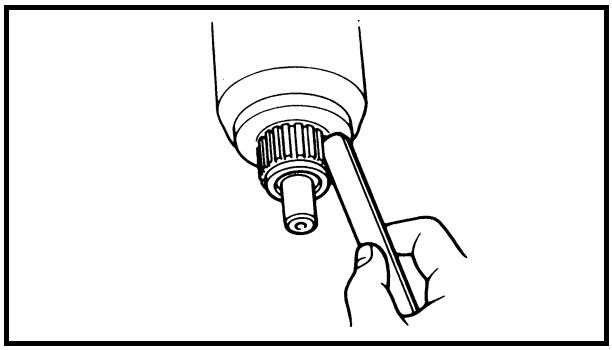


2. Check:
   - Commutator
     Dirt → Clean with 600 grit sandpaper.



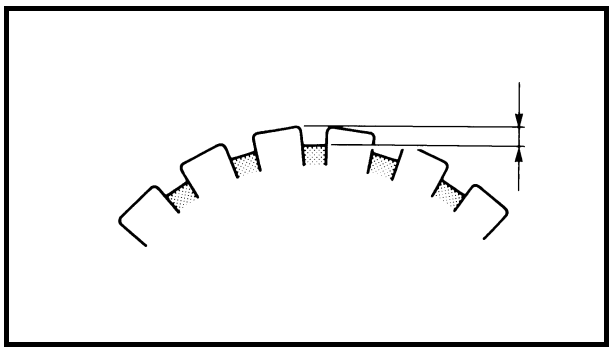
3. Measure:
   - Commutator diameter
     Out of specification → Replace.

	Minimum commutator diameter: 27.0 mm (1.06 in)



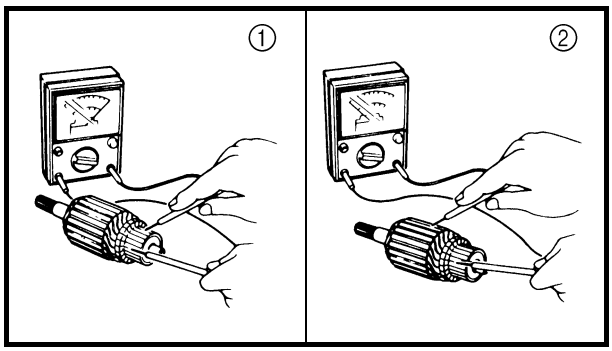
4. Check:
   - Commutator undercut
     Contaminants → Clean.

NOTE:
Use compressed air to remove all mica and metal particles.



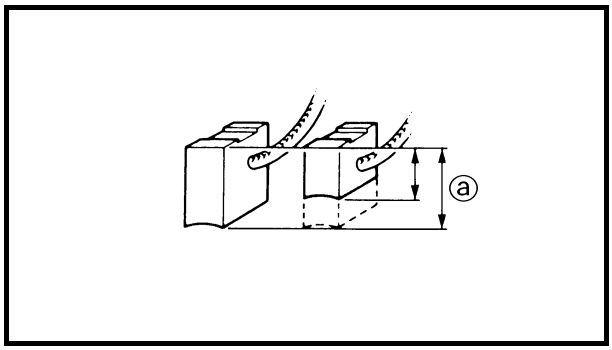
5. Measure:
   - Commutator undercut
     Out of specification → Replace.

	Minimum commutator undercut: 0.2 mm (0.01 in)



6. Check:
   - Armature coil continuity
     Out of specification → Replace.

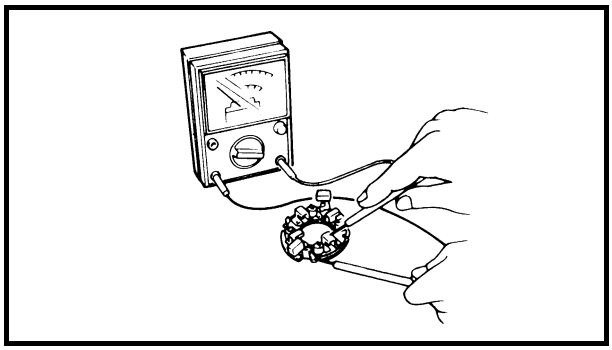
Armature coil continuity:	
Commutator segments ①	Continuity
Segment – laminations ②	No continuity
Segment – armature shaft	No continuity



Brush holder inspection

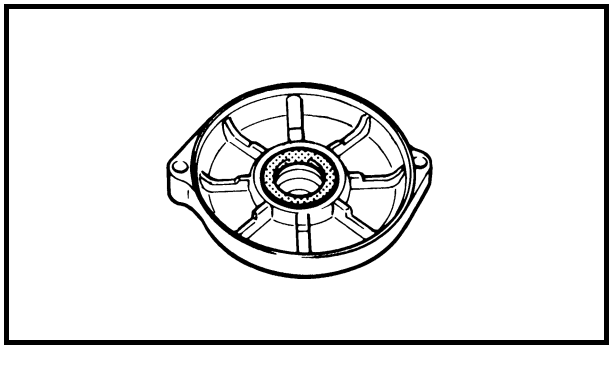
1. Measure:
   - Brush length ⓐ
     Out of specification → Replace.

Minimum brush length: 6.5 mm (0.26 in)



2. Check:
   - Brush holder continuity
     Out of specification → Replace.

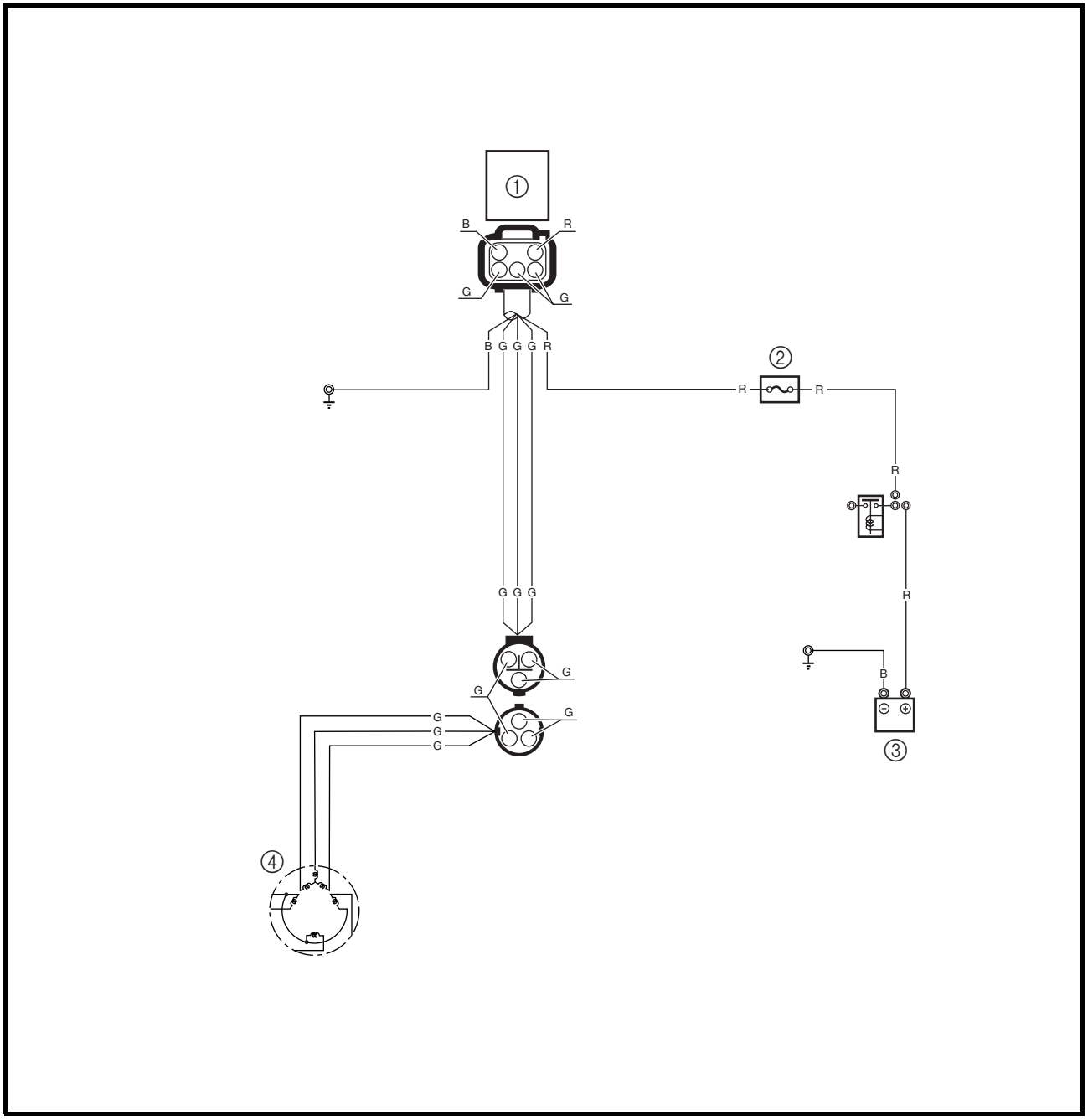
Brush holder continuity:	
Brush holder – base	No continuity



Starter motor front cover inspection

1. Check:
   - Starter motor front cover oil seal
     Damage/wear → Replace the starter motor front cover.

CHARGING SYSTEM
WIRING DIAGRAM



① Rectifier/regulator
② Fuse (20 A)
③ Battery
④ Lighting coil

B : Black
G : Green
R : Red

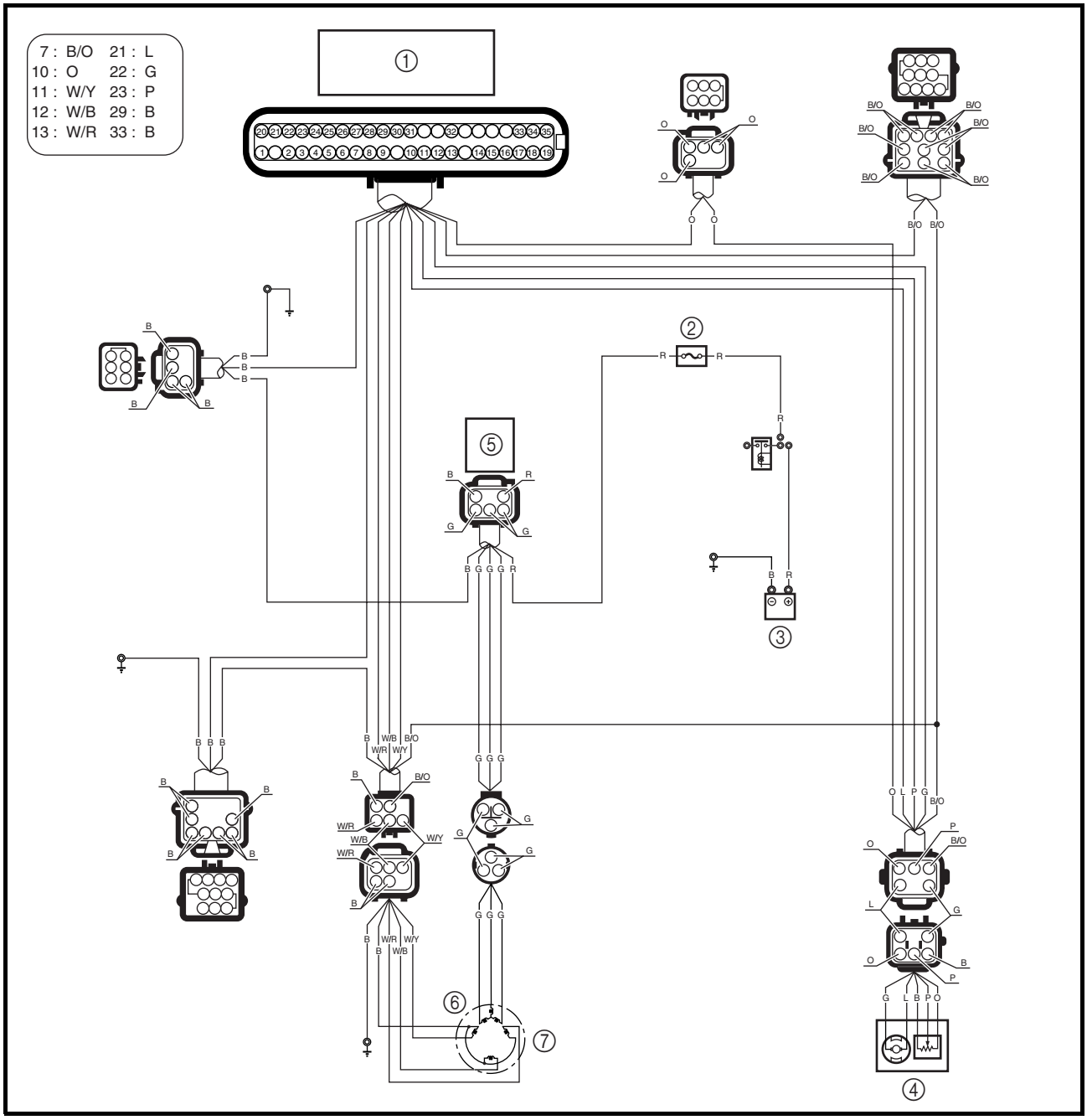
FUSE
Refer to “STARTING SYSTEM.”

BATTERY
Refer to “ELECTRICAL” in Chapter 3.

LIGHTING COIL
Refer to “IGNITION SYSTEM.”

RECTIFIER/REGULATOR
Refer to “IGNITION SYSTEM.”

YPVS
WIRING DIAGRAM



① ECM
② Fuse (20 A)
③ Battery
④ YPVS servomotor
⑤ Rectifier/regulator
⑥ Lighting coil
⑦ Pickup coil

B : Black
G : Green
L : Blue
O : Orange
P : Pink
R : Red
B/O : Black/orange
W/B : White/black
W/R : White/red
W/Y : White/yellow

FUSE
Refer to “STARTING SYSTEM.”

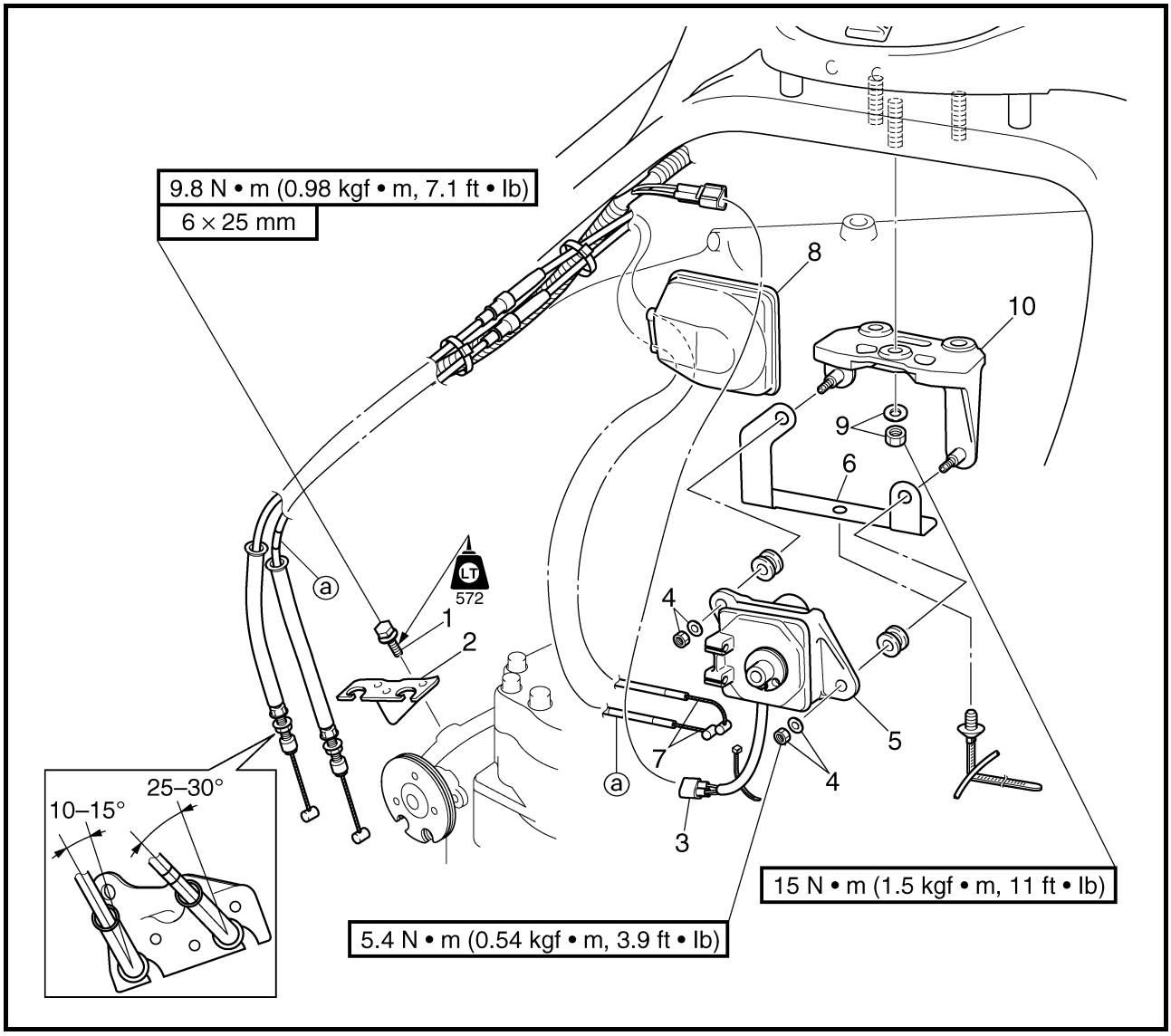
BATTERY
Refer to “ELECTRICAL” in Chapter 3.

PICKUP COIL
Refer to “IGNITION SYSTEM.”

LIGHTING COIL
Refer to “IGNITION SYSTEM.”

RECTIFIER/REGULATOR
Refer to “IGNITION SYSTEM.”

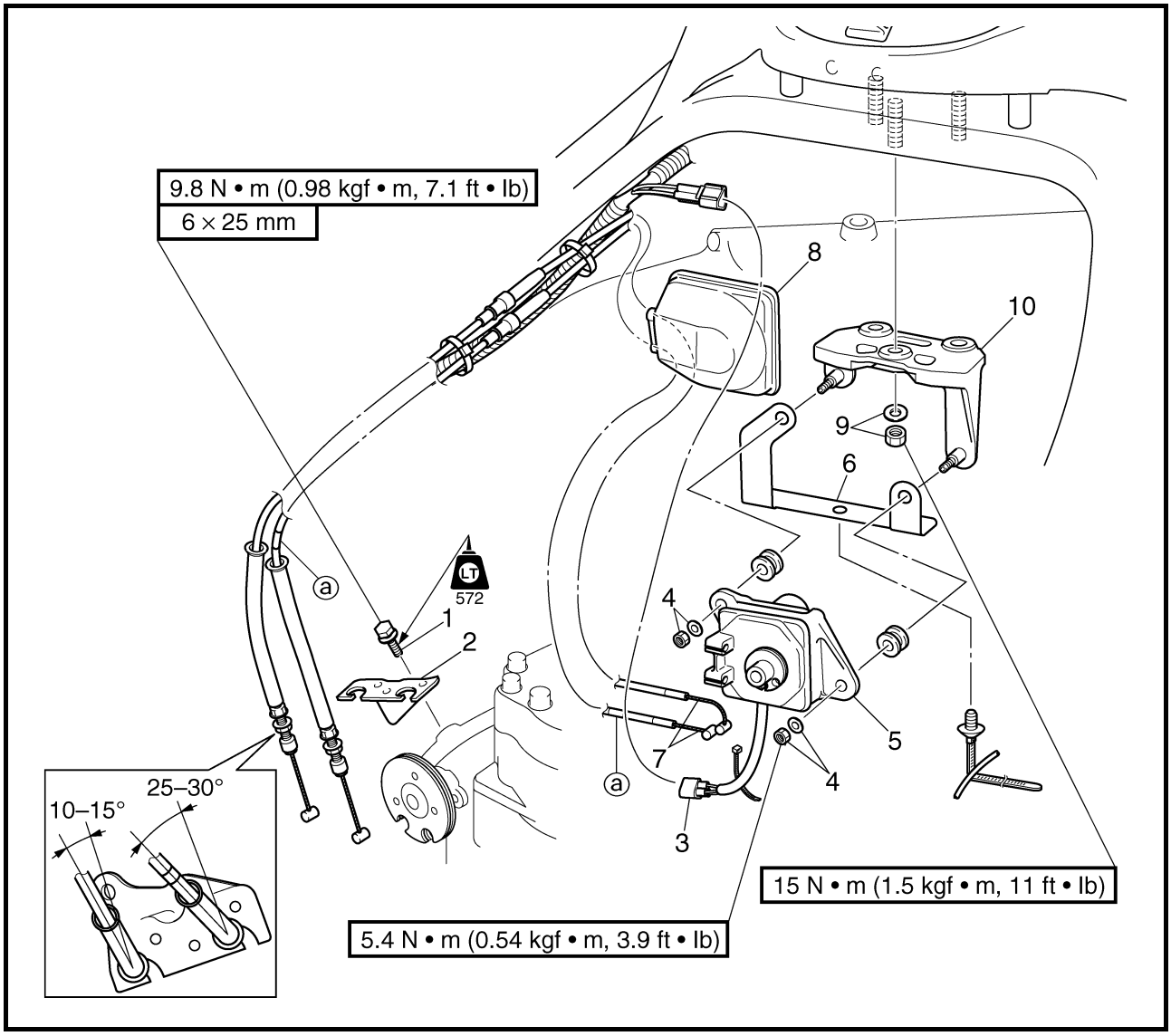
YPVS SERVOMOTOR
EXPLODED DIAGRAM



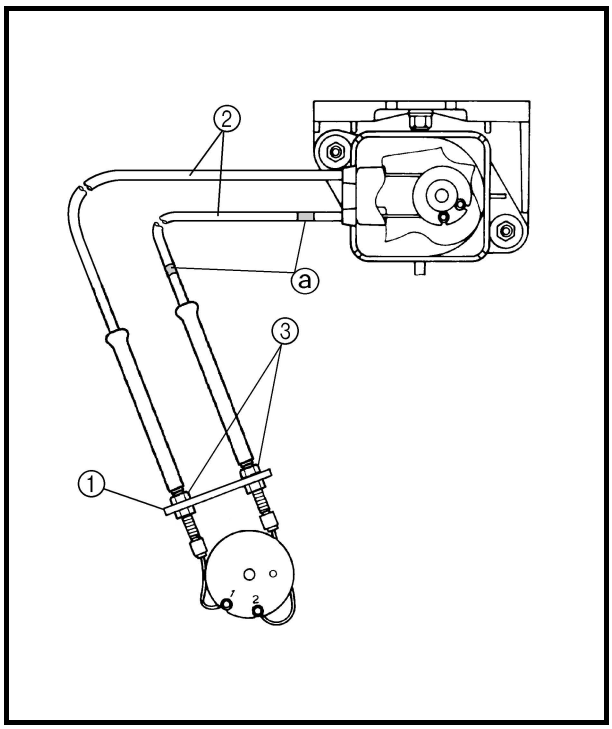
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	YPVS SERVOMOTOR REMOVAL		Follow the left "Step" for removal.
1	Bolt	2	
2	Cable holder	1	
3	YPVS servomotor coupler	1	
4	Nut/washer	2/2	
5	YPVS servomotor	1	
6	Throttle cable plastic tie bracket	1	
7	YPVS cable	2	Slide the cover. Cable 2 is identifiable by its white paint mark ⓐ.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
8	Cover	1	
9	Nut/washer	3/3	
10	YPVS servomotor bracket	1	
			Reverse the removal steps for installation.



SERVICE POINTS

YPVS cable removal and installation

1. Remove:
   - YPVS cables 1 and 2

Removal steps:
- Remove the YPVS cable holder ①.
- Remove the YPVS cables ② from both drums.

NOTE:
- YPVS cable 2 is identifiable by its white paint mark ⓐ.
- When installing the YPVS cable, make sure that the YPVS cable locknuts ③ are fully turned in.

YPVS cable inspection

1. Check:
   - YPVS cables 1 and 2
     Frays/kinks/rough movement → Replace.

YPVS servomotor inspection

1. Check:
   - Check the YPVS servomotor operation using the Yamaha Diagnostic System.

CAUTION:

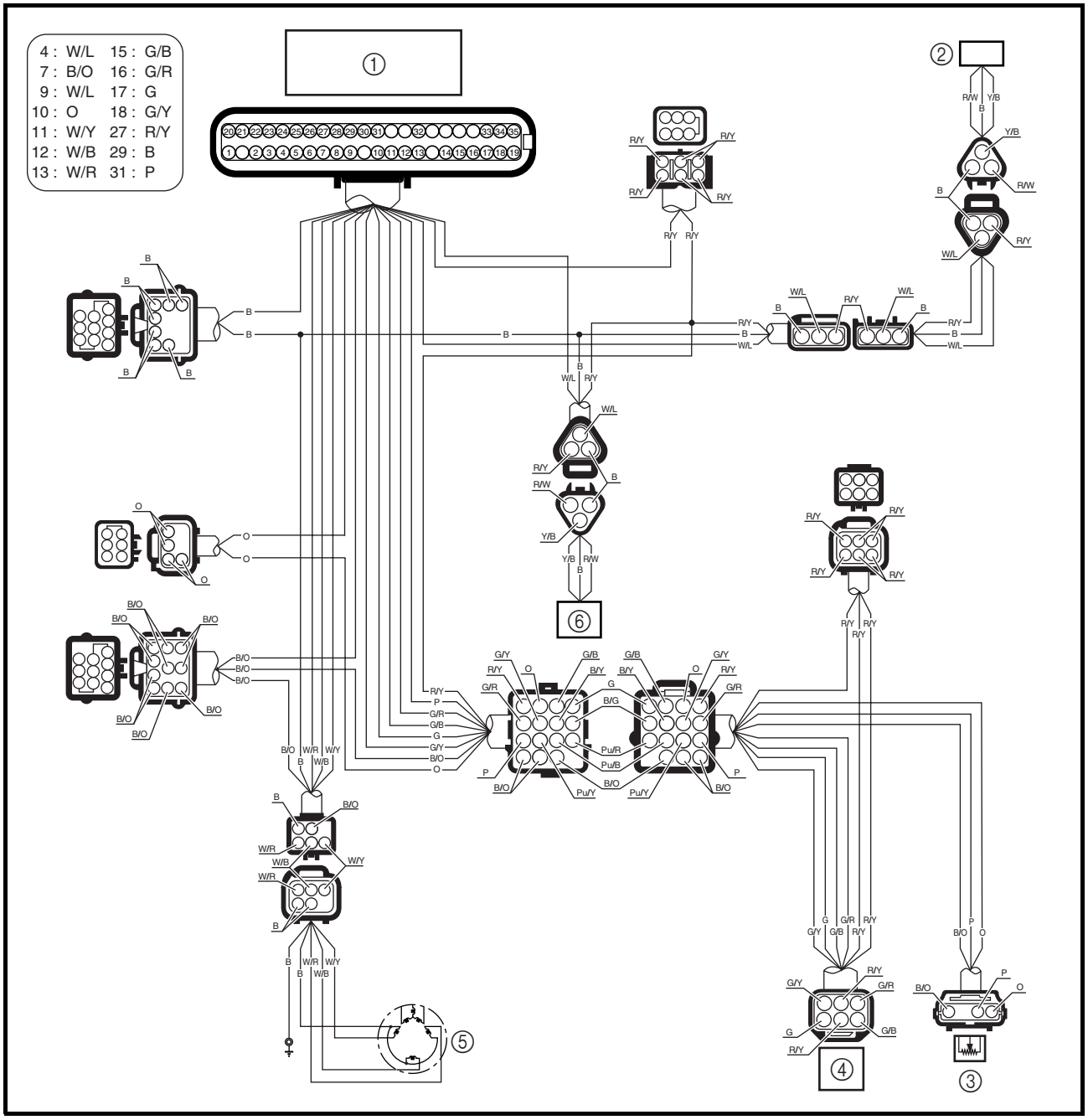
Do not disassemble the YPVS servomotor unit. It is a sealed unit and if it is faulty it must be replaced.

YPVS cable adjustment

Refer to “POWER UNIT” in Chapter 3.

OFF THROTTLE STEERING SYSTEM

WIRING DIAGRAM



① ECM
② Throttle switch
③ Throttle position sensor
④ Stepping motor
⑤ Pickup coil
⑥ Steering switch

B : Black
G : Green
O : Orange
P : Pink
B/O : Black/orange
G/B : Green/black
G/R : Green/red
G/Y : Green/yellow
R/W : Red/white
R/Y : Red/yellow

W/B : White/black
W/L : White/blue
W/R : White/red
W/Y : White/yellow
Y/B : Yellow/black

STEERING SWITCH

1. Check:
   - Steering switch
     Refer to “SELF-DIAGNOSIS” in Chapter 9.
     Malfunction → Check that the steering switch switches on and off when the handlebar is turned to the right and to the left using the “Engine monitor” of the Yamaha Diagnostic System.
     Does not operate → Replace.

STEPPING MOTOR

1. Check:
   - Check the operation of the stepping motor using the “Stationary test” of the Yamaha Diagnostic System.

THROTTLE SWITCH

1. Check:
   - Check the operation of the throttle switch using the “Engine monitor” of the Yamaha Diagnostic System.

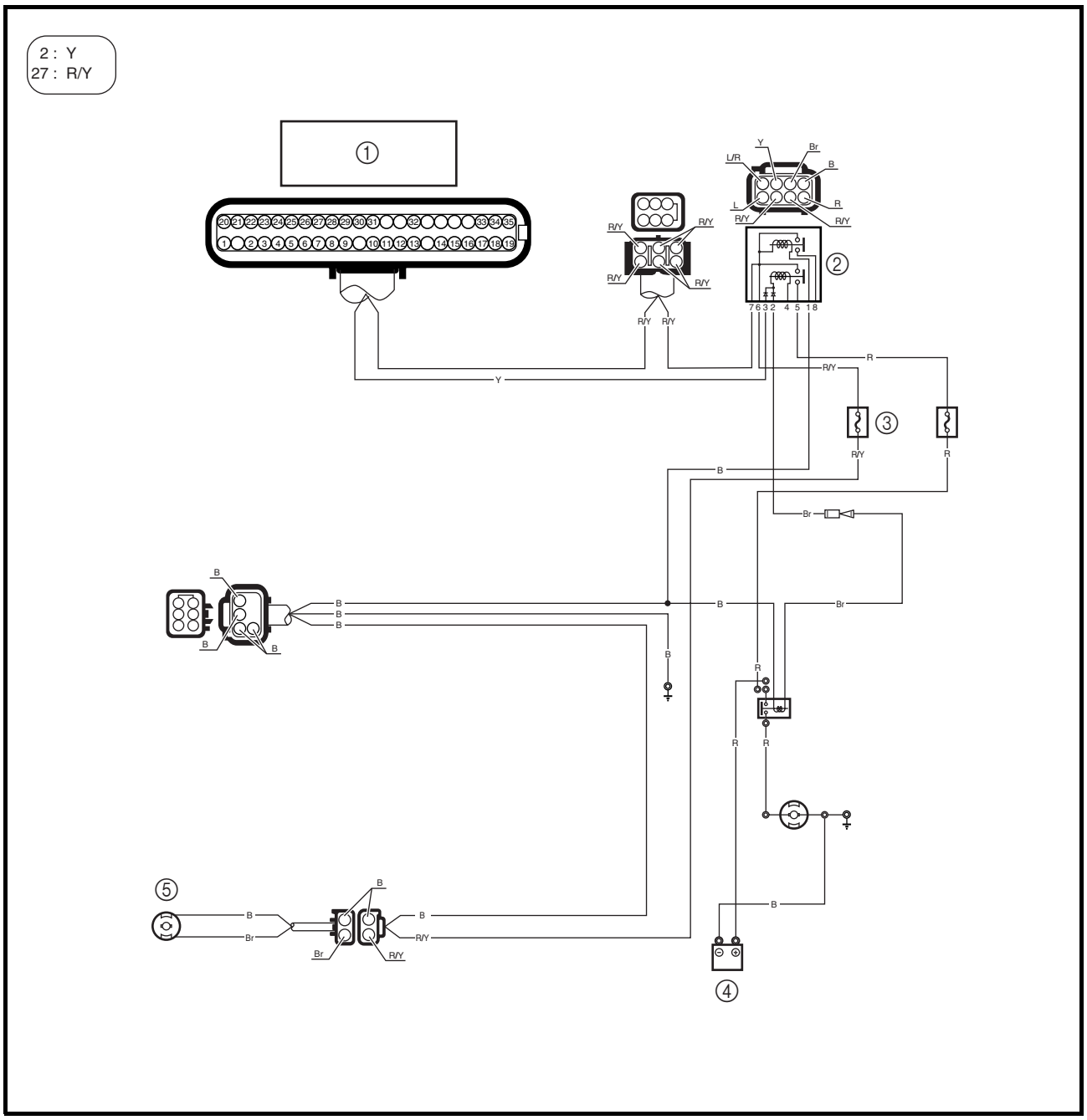
PICKUP COIL

Refer to “IGNITION SYSTEM.”

THROTTLE POSITION SENSOR

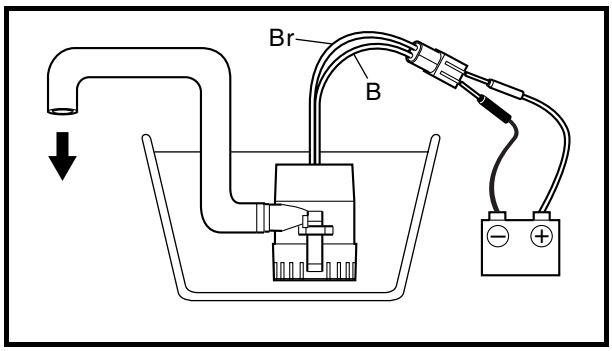
Refer to “IGNITION SYSTEM.”

ELECTRIC BILGE PUMP
WIRING DIAGRAM



① ECM
② Main and fuel pump relay
③ Fuse (3 A)
④ Battery
⑤ Electric bilge pump

B : Black
Br : Brown
R : Red
Y : Yellow
R/Y : Red/yellow



ELECTRIC BILGE PUMP

1. Check:
   - Electric bilge pump operation
     Does not operate → Replace.

Checking steps:
- Suspend the electric bilge pump in a container filled with water.
- Connect the brown lead terminal to the positive battery terminal.
- Connect the black lead terminal to the negative battery terminal.
- Check that the water flows from the electric bilge pump hose.

FUSE

Refer to “STARTING SYSTEM.”

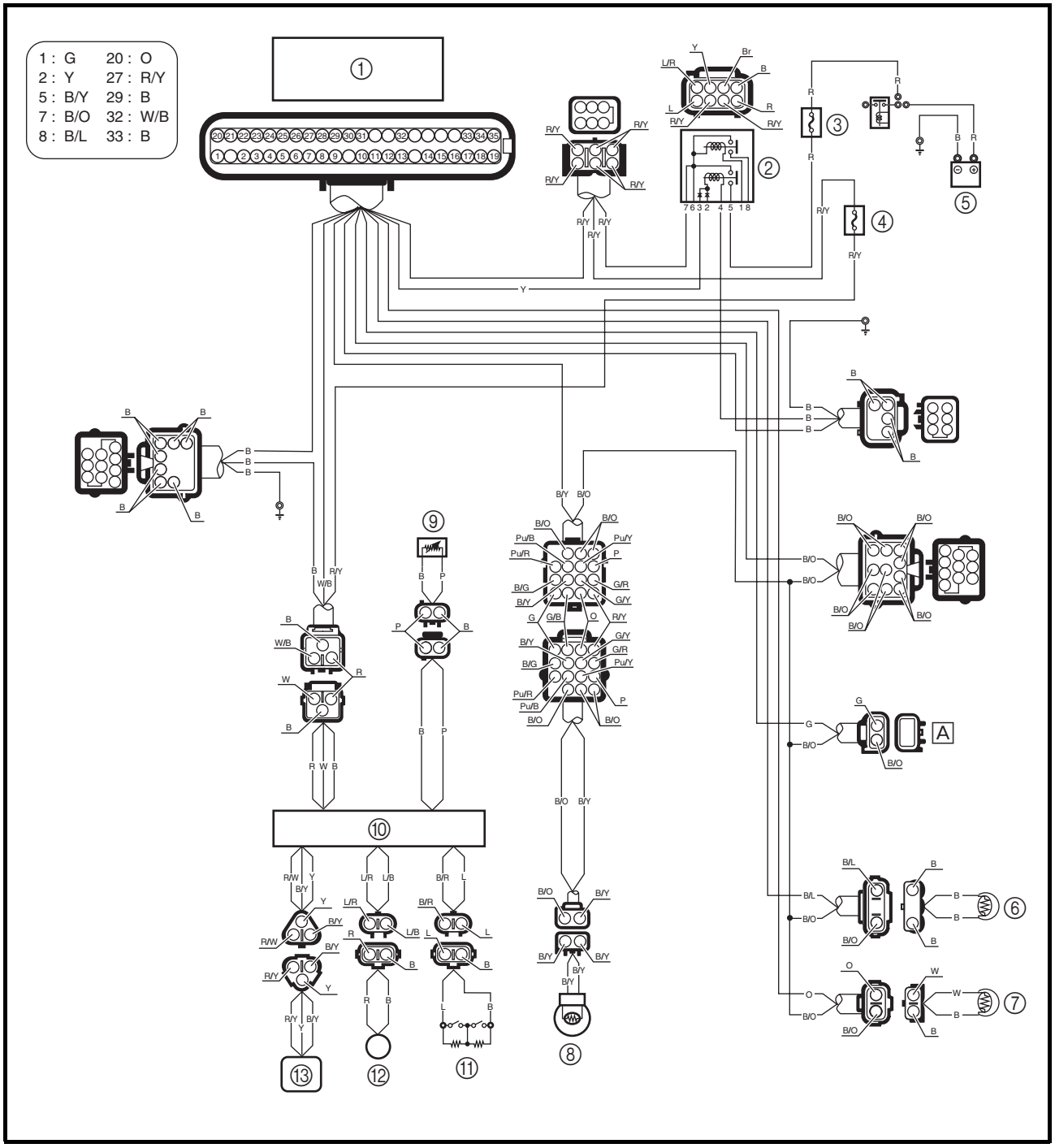
BATTERY

Refer to “ELECTRICAL” in Chapter 3.

MAIN AND FUEL PUMP RELAY

Refer to “IGNITION SYSTEM.”

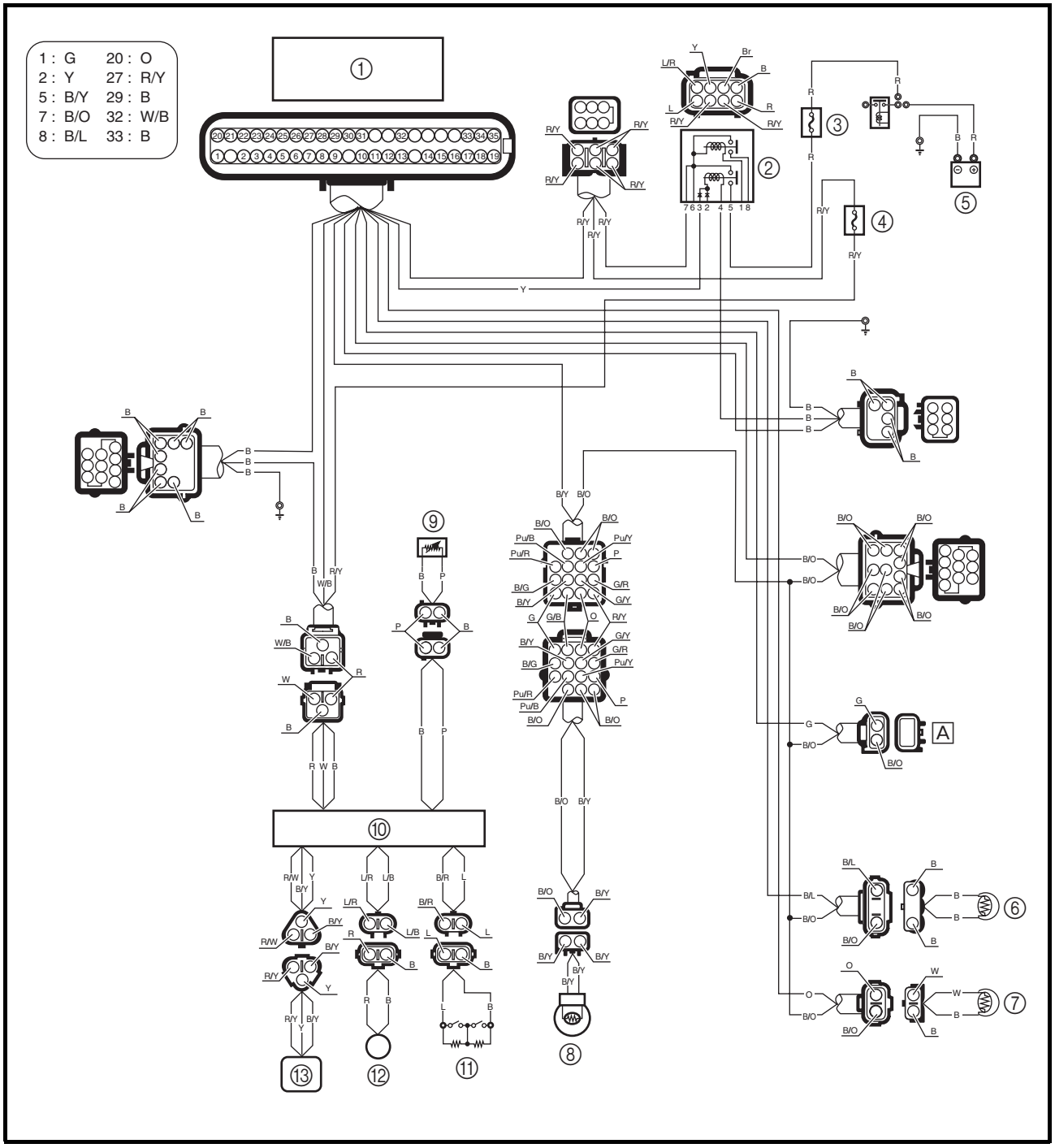
INDICATION SYSTEM
WIRING DIAGRAM



① ECM
② Main and fuel pump relay
③ Fuse (20 A)
④ Fuse (3 A)
⑤ Battery
⑥ Cooling water temperature sensor
⑦ Exhaust temperature sensor
⑧ Engine temperature sensor
⑨ Fuel sender
⑩ Multifunction meter
⑪ Oil level sensor
⑫ Buzzer
⑬ Speed sensor

A To tachometer

WIRING DIAGRAM



B : Black
G : Green
L : Blue
O : Orange
P : Pink
R : Red
W : White
Y : Yellow
B/L : Black/blue
B/O : Black/orange
B/R : Black/red
B/Y : Black/yellow
L/B : Blue/black
L/R : Blue/red
R/W : Red/white
R/Y : Red/yellow
W/B : White/black

FUSE
Refer to “STARTING SYSTEM.”

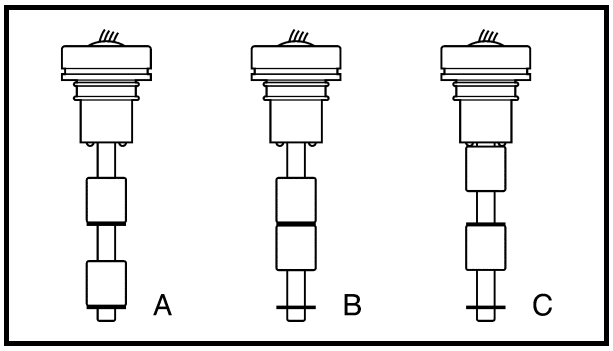
BATTERY
Refer to “ELECTRICAL” in Chapter 3.

ENGINE TEMPERATURE SENSOR
Refer to “IGNITION SYSTEM.”

COOLING WATER TEMPERATURE SENSOR
Refer to “IGNITION SYSTEM.”

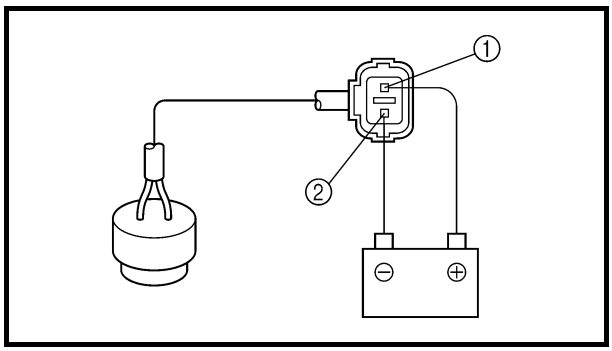
EXHAUST TEMPERATURE SENSOR
Refer to “IGNITION SYSTEM.”

MAIN AND FUEL PUMP RELAY
Refer to “IGNITION SYSTEM.”



OIL LEVEL SENSOR
1. Measure:
   - Oil level sensor resistance
     Out of specification → Replace.

Blue (L) – Black (B)	
Float position	Resistance (Ω)
A	292–308
B	97–103
C	0–3



BUZZER

1. Check:
   - Buzzer
     Buzzer does not sound → Replace.

Checking steps:
- Connect a 12 V battery to the buzzer coupler as shown.

Positive battery terminal →
Red (R) terminal ①
Negative battery terminal →
Black (B) terminal ②

MULTIFUNCTION METER

Multifunction meter

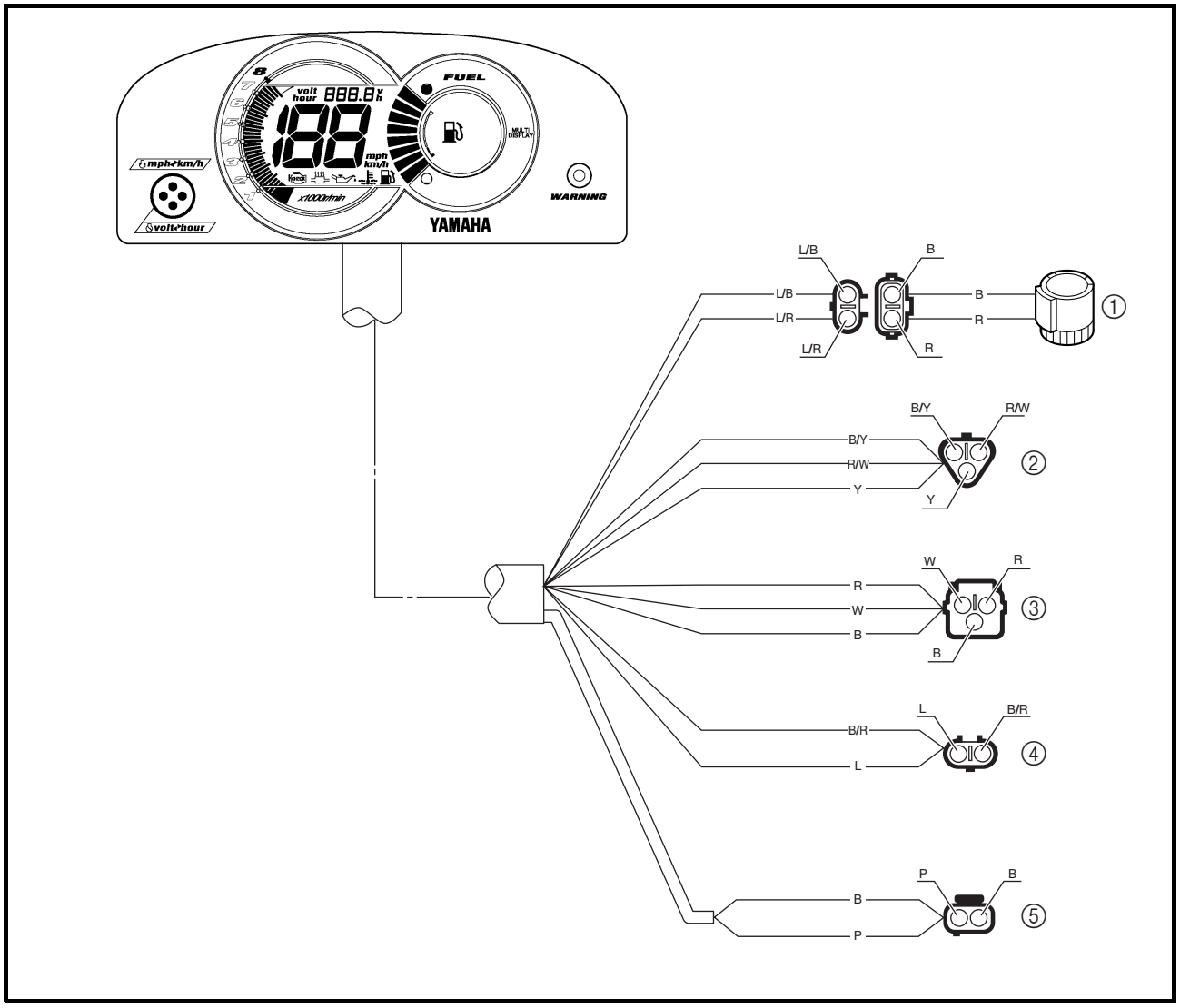
1. Check:
   - Multifunction meter
     Cracked meter housing → Replace the multifunction meter.
     Meter is fogged/shows signs of water intrusion → Replace the multifunction meter.

MULTIFUNCTION METER REMOVAL

Refer to “STEERING CONSOLE COVER” in Chapter 8.

Display function

1. Check:
   - Display function
     Does not operate → Replace the multi-function meter.



① Buzzer
② Speed sensor
③ ECM
④ Oil level sensor
⑤ Fuel sender

B : Black
L : Blue
P : Pink
R : Red
W : White
Y : Yellow
B/R : Black/red
B/Y : Black/yellow
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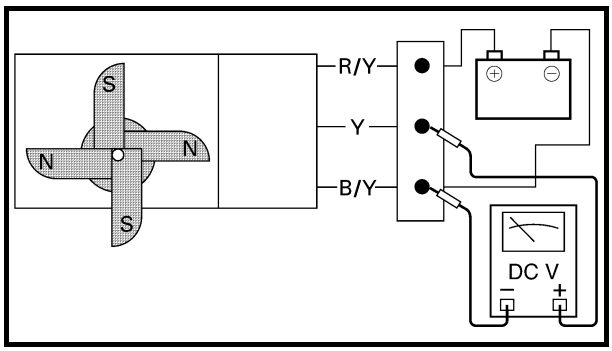
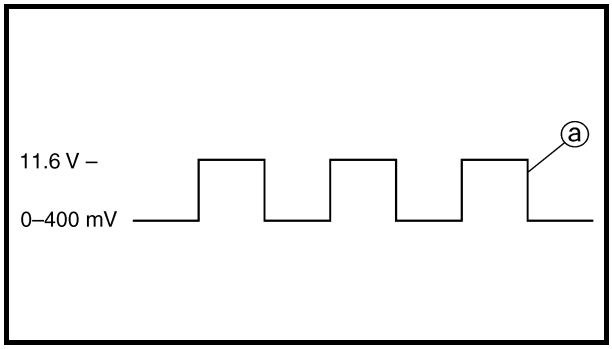




Speedometer display

1. Check:
   - Speedometer display
     Does not display → Measure the speed sensor output voltage and pulses.
2. Measure:
   - Speed sensor output voltage and pulses
     Out of specification → Replace the speed sensor.
     Within specification → Replace the multifunction meter.

Speed sensor output voltage (dependant on the paddle wheel position):
Less than 400 mV
More than 11.6 V
Output pulse:
2 pulses/1 full turn

Measurement steps:

- Connect a 12 volt battery to the white three-pin connector (between the red/yellow and black/yellow leads).
- Rotate the paddle wheel by hand and measure the voltage between the yellow and black/yellow leads.

NOTE:
As the paddle wheel is rotated, a square-wave voltage signal ⓐ is produced.

- Two pulses occur every time the paddle wheel makes one full turn.

Tachometer display

1. Check:
   - Tachometer display
     Does not display → Check the engine speed using the “Engine monitor” of the Yamaha Diagnostic System.
     If there is no malfunction, replace the multifunction meter.

Hour meter display

1. Check:
   - Hour meter display
     Does not display → Replace the multifunction meter.

Voltage meter display

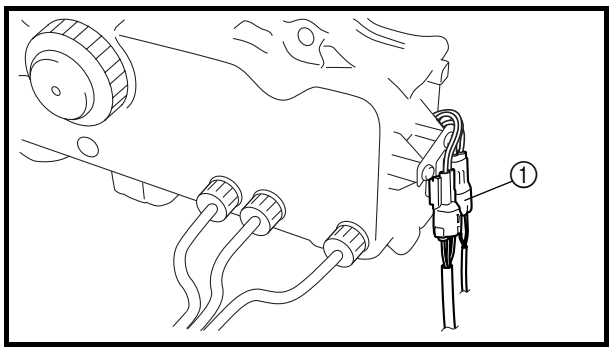
1. Check:
   - Voltage meter display
     Does not display → Check the battery voltage using the "Engine monitor" of the Yamaha Diagnostic System.
     If there is no malfunction, replace the multifunction meter.

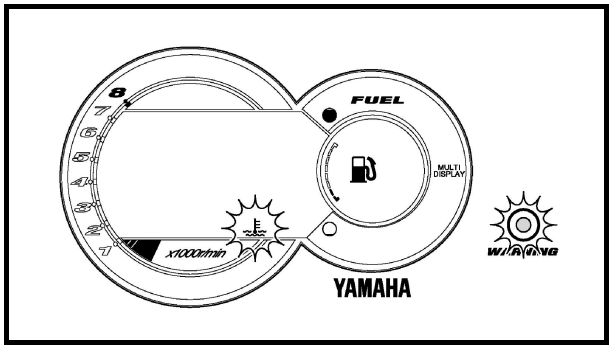
Fuel level meter display and fuel warning indicator

1. Check:
   - Fuel level meter display and fuel warning indicator
     Do not display → Measure the fuel sender resistance.
     If the fuel sender resistance is within specification, replace the multifunction meter.
2. Measure:
   - Fuel sender resistance
     Refer to "FUEL CONTROL SYSTEM."

Oil warning indicator

1. Check:
   - Oil warning indicator
     Does not display → Measure the oil level sensor resistance.
     If the oil level sensor resistance is within specification, replace the multifunction meter.
2. Measure:
   - Oil level sensor resistance
     Refer to "OIL LEVEL SENSOR."

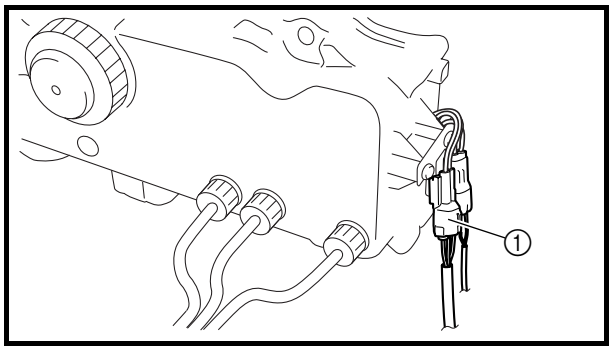


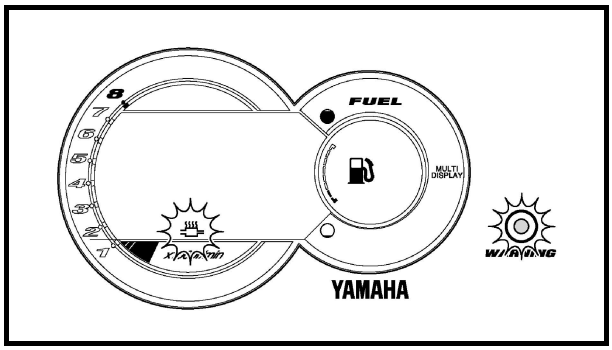


Engine overheat warning indicator

1. Check:
   - Engine overheat warning indicator
     Does not operate → Replace the multi-function meter.

Checking steps:
- Start the engine.
- Disconnect the cooling water temperature sensor coupler ①.
- Check that the warning light comes on and that the engine overheat warning indicator is displayed.

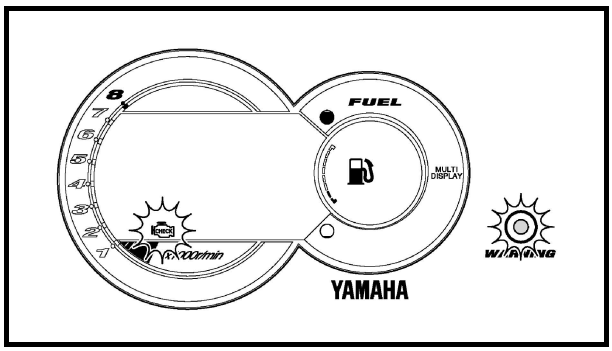




Exhaust temperature warning indicator

1. Check:
   - Exhaust temperature warning indicator
     Does not operate → Replace the multi-function meter.

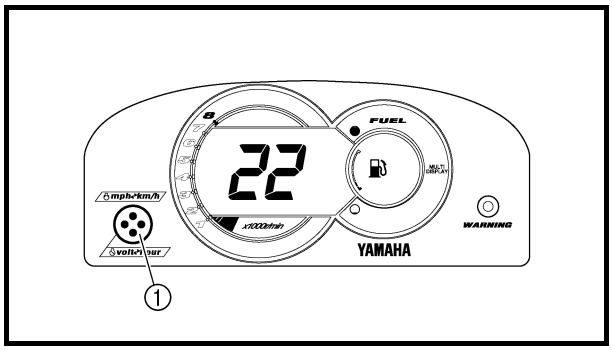
Checking steps:
- Disconnect the exhaust temperature sensor coupler ①.
- Start the engine and warm it up for more than 2 minutes at 4,000 r/min.
- Check that the warning light and exhaust temperature warning indicator blink and that the buzzer sounds intermittently when the engine is started.



Check engine warning indicator

1. Check:
   - Check engine warning indicator
     Does not operate → Replace the multifunction meter.

Checking steps:
- Start the engine.
- Disconnect the coupler of a sensor (e.g., atmospheric pressure sensor) that normally activates the check engine warning indicator when a malfunction occurs.
- Check that the warning light and check engine warning indicator blink and that the buzzer sounds intermittently.



Diagnostic display

1. Check:
   - Diagnostic display
     Does not display → Replace the multifunction meter.

Checking steps:
- Start the engine.
- Disconnect the coupler of a sensor (e.g., atmospheric pressure sensor) that is normally displayed when a malfunction occurs. Refer to “SELF-DIAGNOSIS” in Chapter 9.
- Check that the check engine warning indicator is displayed and that the buzzer sounds.
- Press the select switch ① for 8 seconds and check if an error code is indicated on the multifunction meter.

CHAPTER 8
HULL AND HOOD

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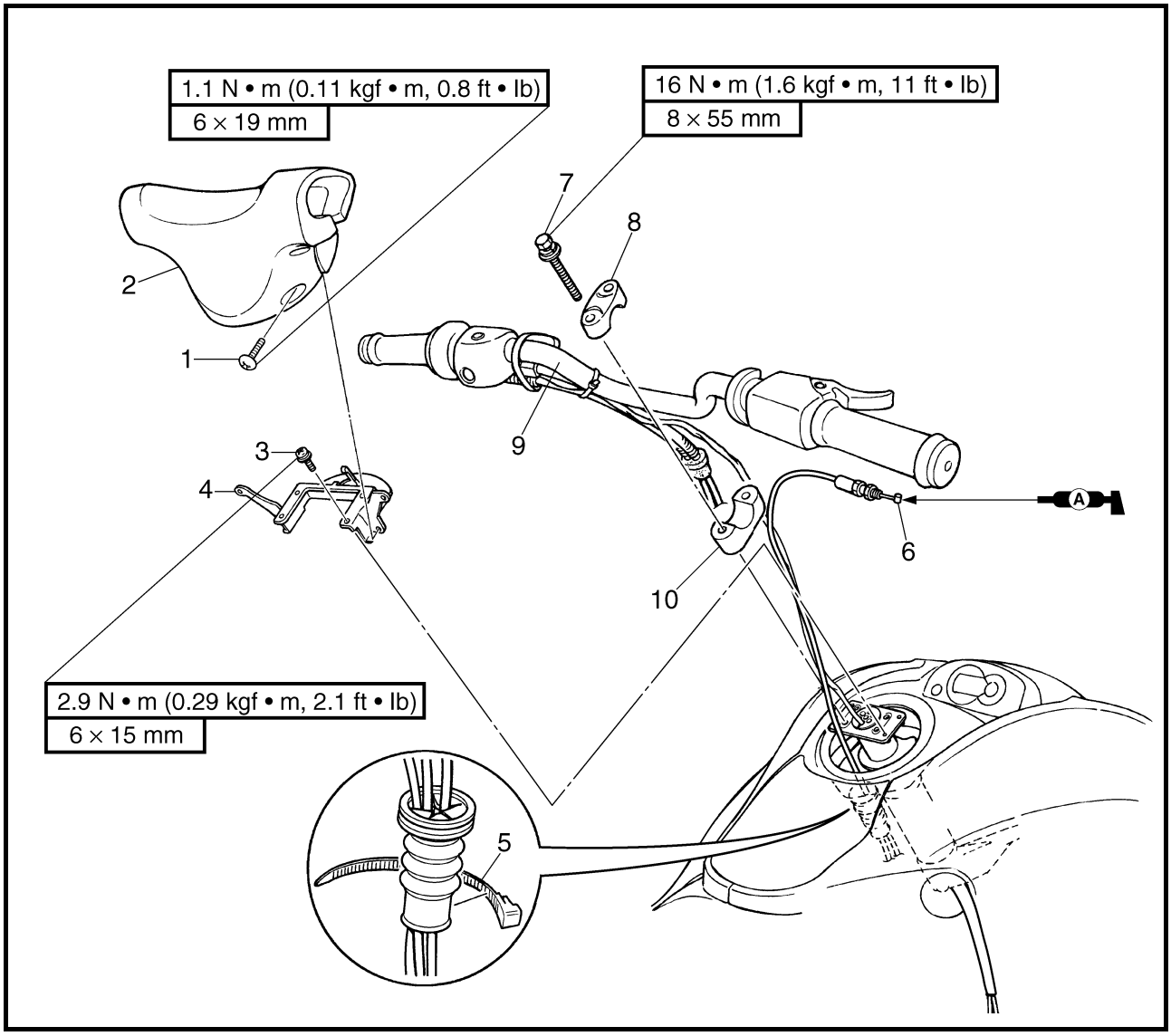
HANDLEBAR

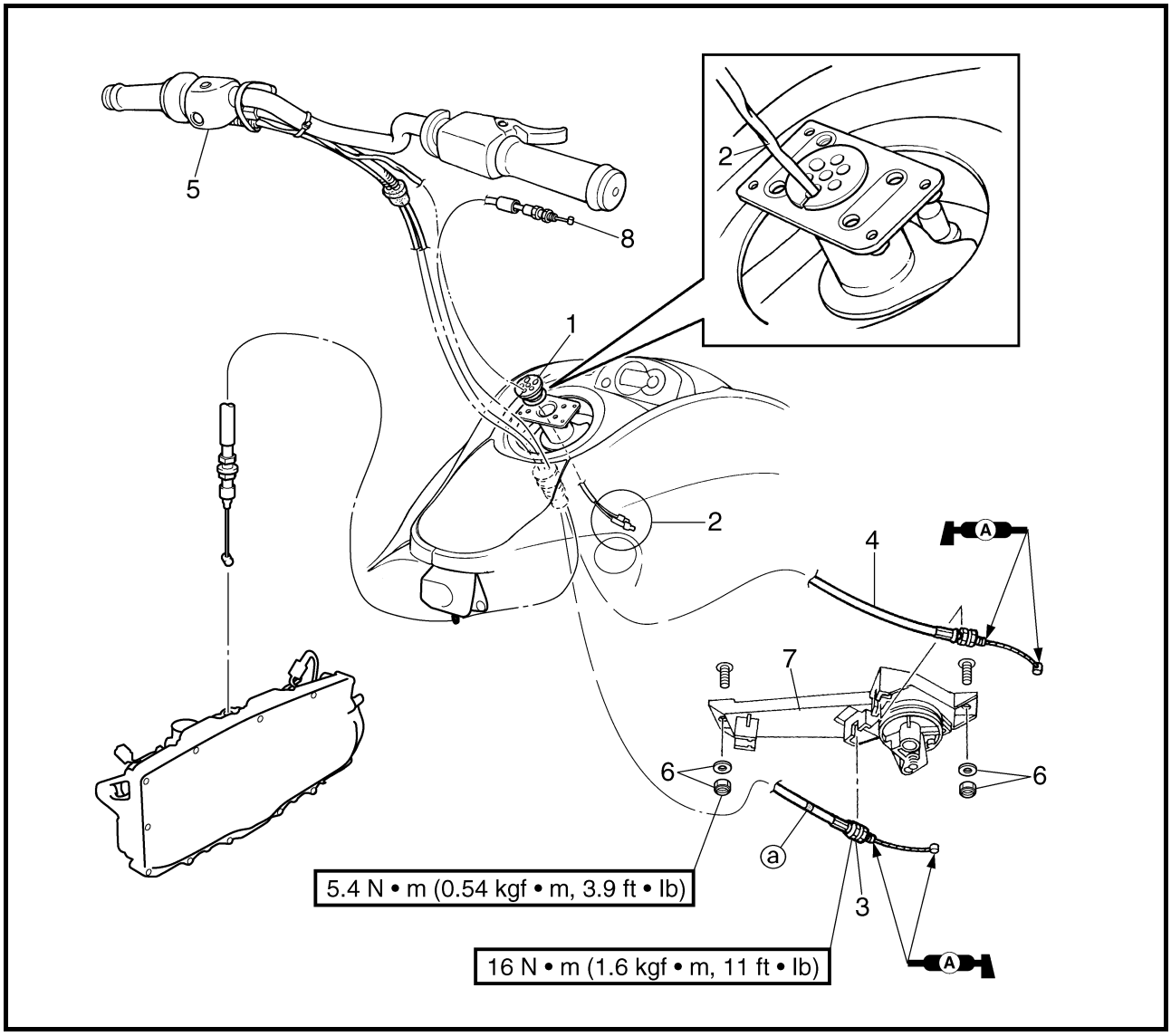
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	HANDLEBAR COVER REMOVAL		Follow the left "Step" for removal.
1	Screw	4	
2	Handlebar cover	1	
3	Screw	4	
4	Handlebar cover stay	1	
5	Plastic tie	1	
6	Throttle cable	1	
7	Bolt	4	
8	Upper handlebar holder	2	
9	Handlebar assembly	1	
10	Lower handlebar holder	2	
			Reverse the removal steps for installation.

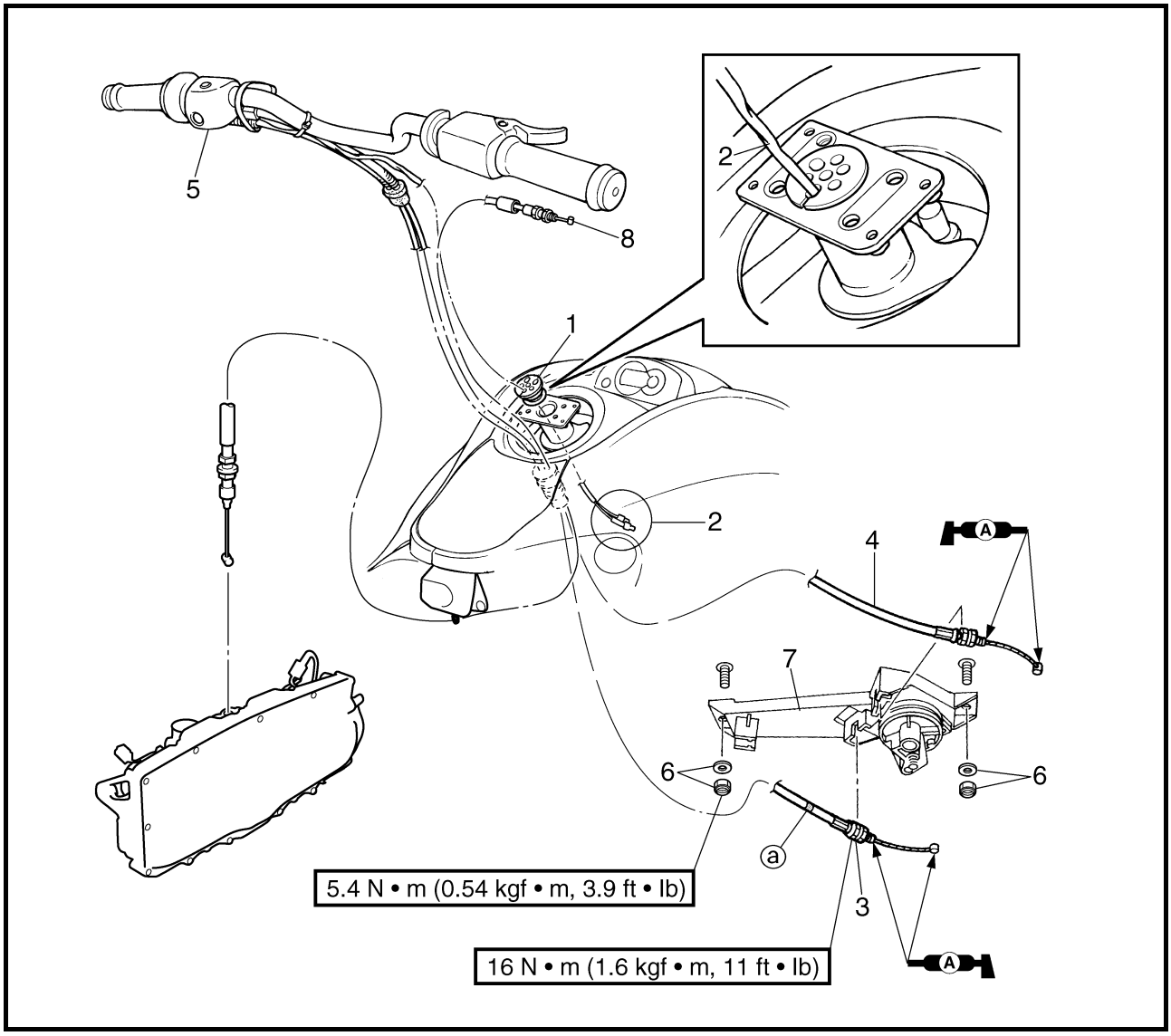
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

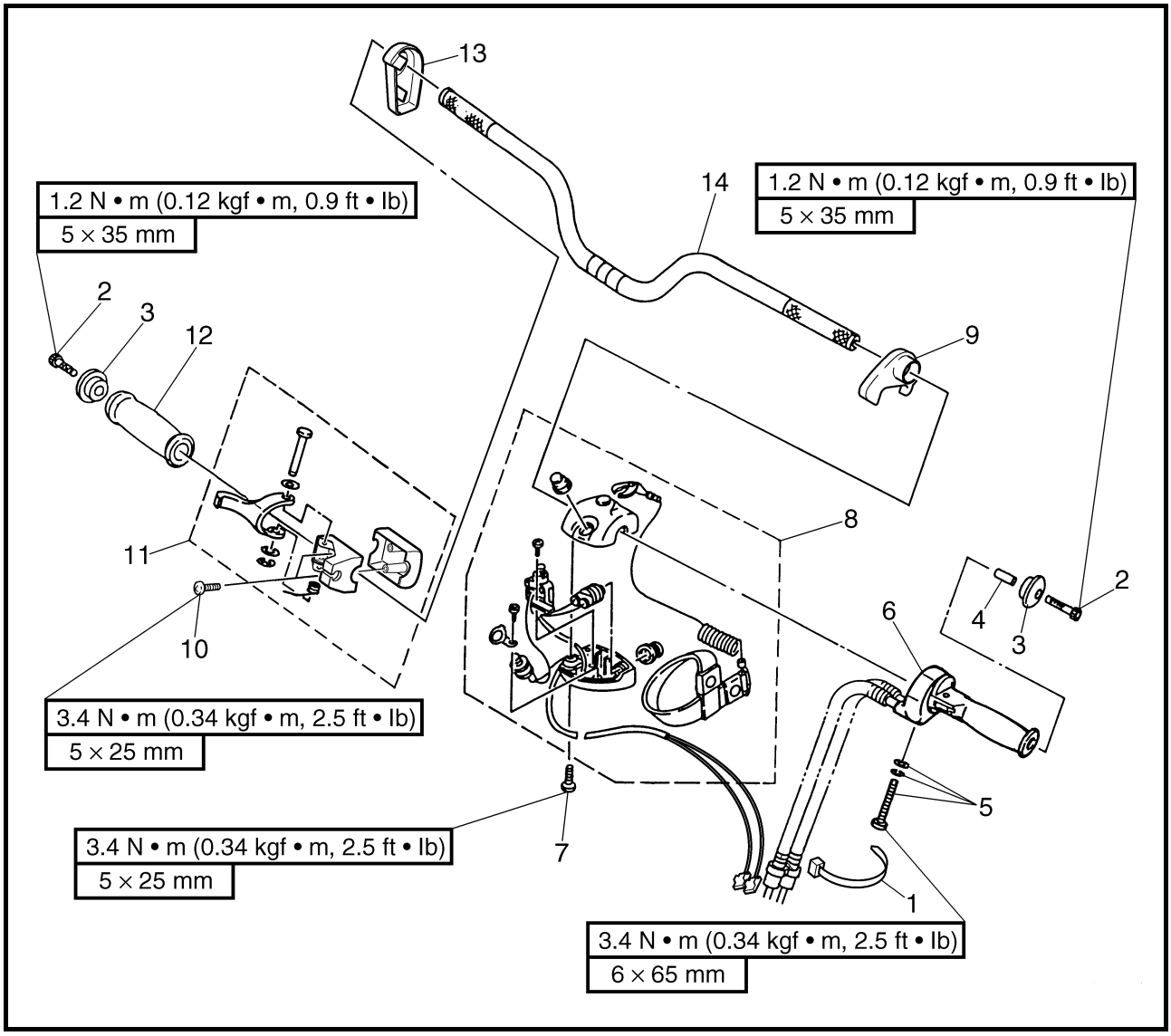
Step	Procedure/Part name	Q'ty	Service points
	HANDLEBAR REMOVAL		Follow the left "Step" for removal.
	QSTS cable (to jet thrust nozzle)		Refer to "REMOTE CONTROL CABLES AND SPEED SENSOR LEAD."
1	Grommet	1	**NOTE:** To ease installation, apply soapy water to the grommet.
2	Handlebar switch coupler	2	
3	QSTS cable 2	1	Cable 2 is identifiable by the white tape ⓐ wrapped around it.
4	QSTS cable 1	1	**NOTE:** Route the QSTS cables behind the oil filler hose.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
5	Handlebar assembly	1	
6	Nut/washer	2/2	
7	QSTS converter	1	
8	Throttle cable	1	
			Reverse the removal steps for installation.

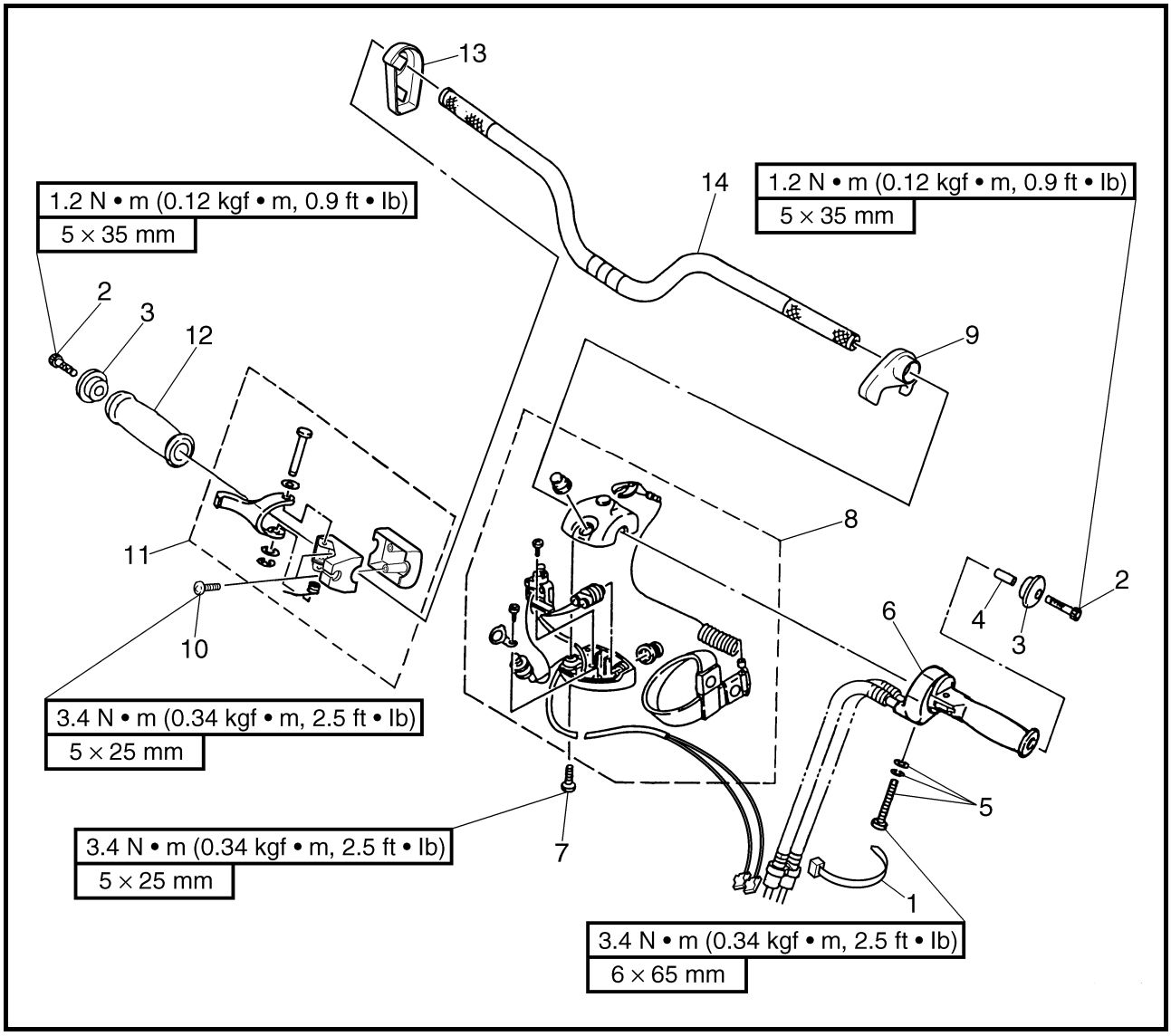
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	HANDLEBAR DISASSEMBLY		Follow the left "Step" for disassembly.
1	Plastic tie	1	
2	Bolt	2	
3	Grip end	2	
4	Spacer	1	
5	Screw/spring washer/washer	1/1/1	
6	QSTS grip assembly	1	
7	Screw	2	
8	Handlebar switch assembly	1	
9	Spacer 1	1	
10	Screw	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
11	Throttle lever assembly	1	
12	Handlebar grip	1	**NOTE:** Apply adhesive to the handlebar and the inner surface of the handlebar grip.
13	Spacer 2	1	
14	Handlebar	1	
			Reverse the disassembly steps for assembly.

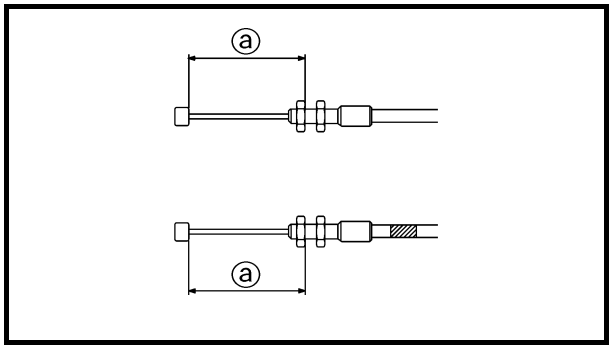
SERVICE POINTS

Handlebar inspection

1. Check:
   - Handlebar
     Bends/cracks/damage → Replace.

Handlebar switch inspection

Refer to "IGNITION SYSTEM" and "STARTING SYSTEM" in Chapter 7.



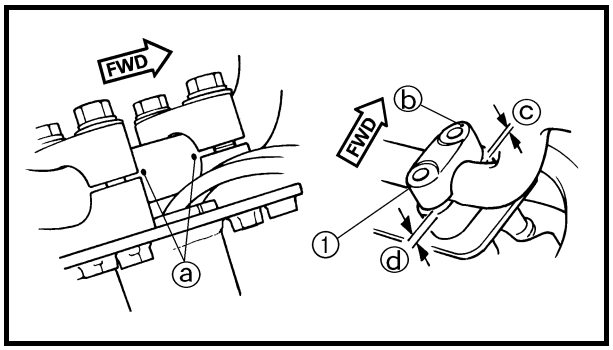
Handlebar assembly installation

1. Adjust:
   - QSTS cable length ⓐ

QSTS cable length:
72 ± 0.5 mm (2.83 ± 0.02 in)

NOTE:

- Before adjusting the QSTS cables, set the control grip to the neutral position.
- Adjust the QSTS cables to the specified length ⓐ and be sure to take up any slack if necessary.



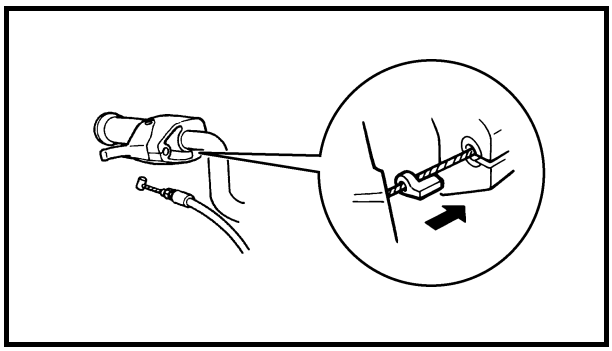
2. Install:
   - Upper handlebar holders ①

NOTE:

- Align the punch marks ⓐ on the handlebar with the top surface of the lower handlebar holders.
- Install the upper handlebar holders with the punch marks ⓑ facing forward.

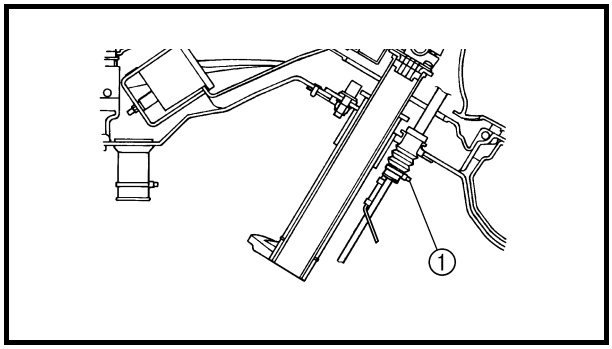
CAUTION:

Clearance ⓒ should be narrower than clearance ⓓ.



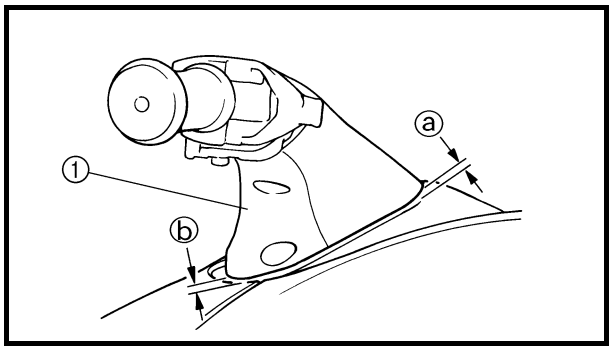
3. Install:
   - Throttle cable

NOTE:
Fit the seal into the groove in the bracket.



4. Install:
   - Plastic tie ①

NOTE:
After inserting the QSTS cables and throttle cable into the grommet, fasten the end of grommet with the plastic tie.



5. Install:
   - Handlebar cover ①

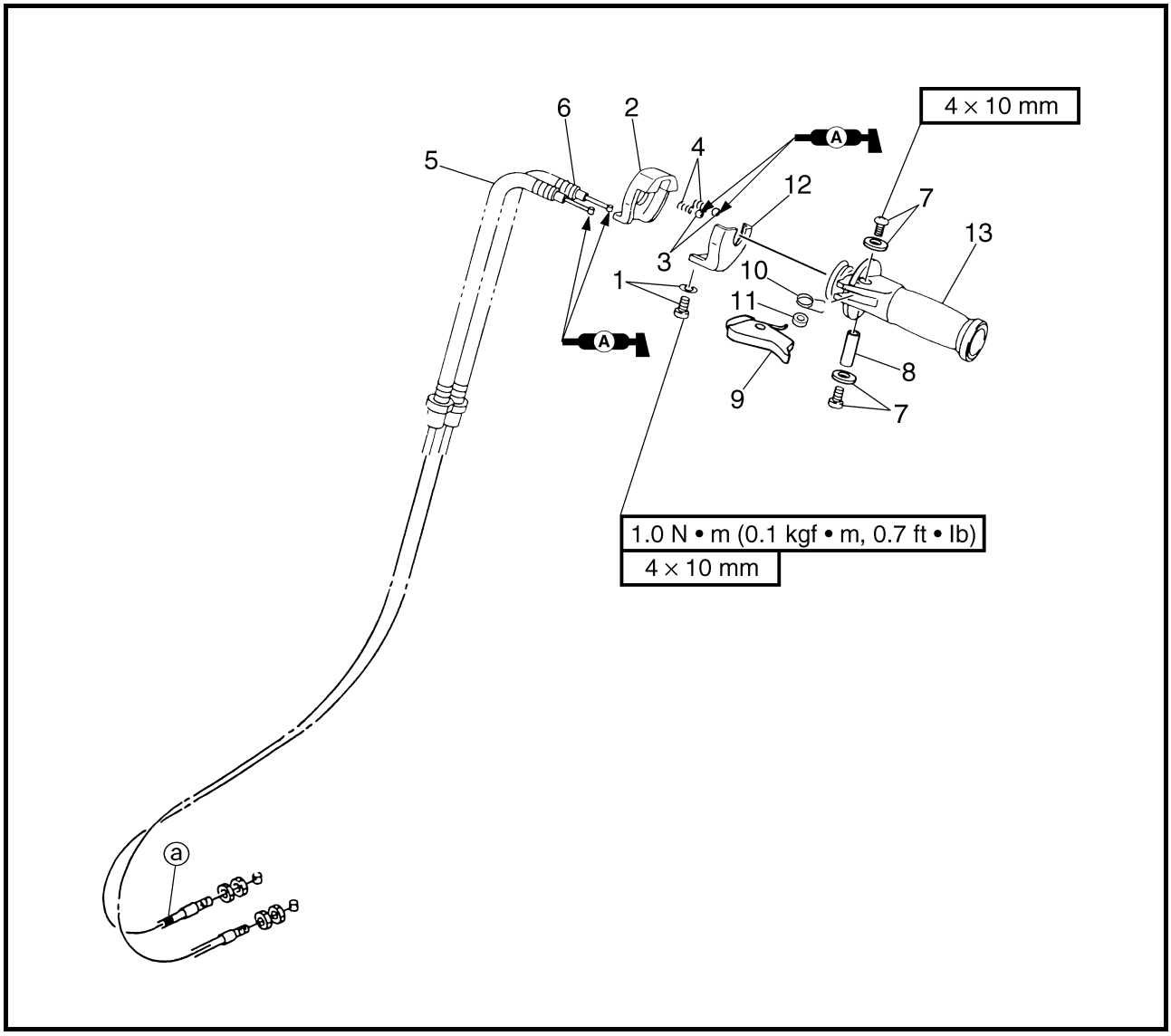
NOTE:
When the handlebar cover is in contact with the steering console cover, adjust the handlebar mounting angle so that clearances ⓐ and ⓑ are equal.

6. Adjust:
   - Throttle lever free play
     Refer to “CONTROL SYSTEM” in Chapter 3.

7. Adjust:
   - QSTS cable
     Refer to “CONTROL SYSTEM” in Chapter 3.

QSTS GRIP

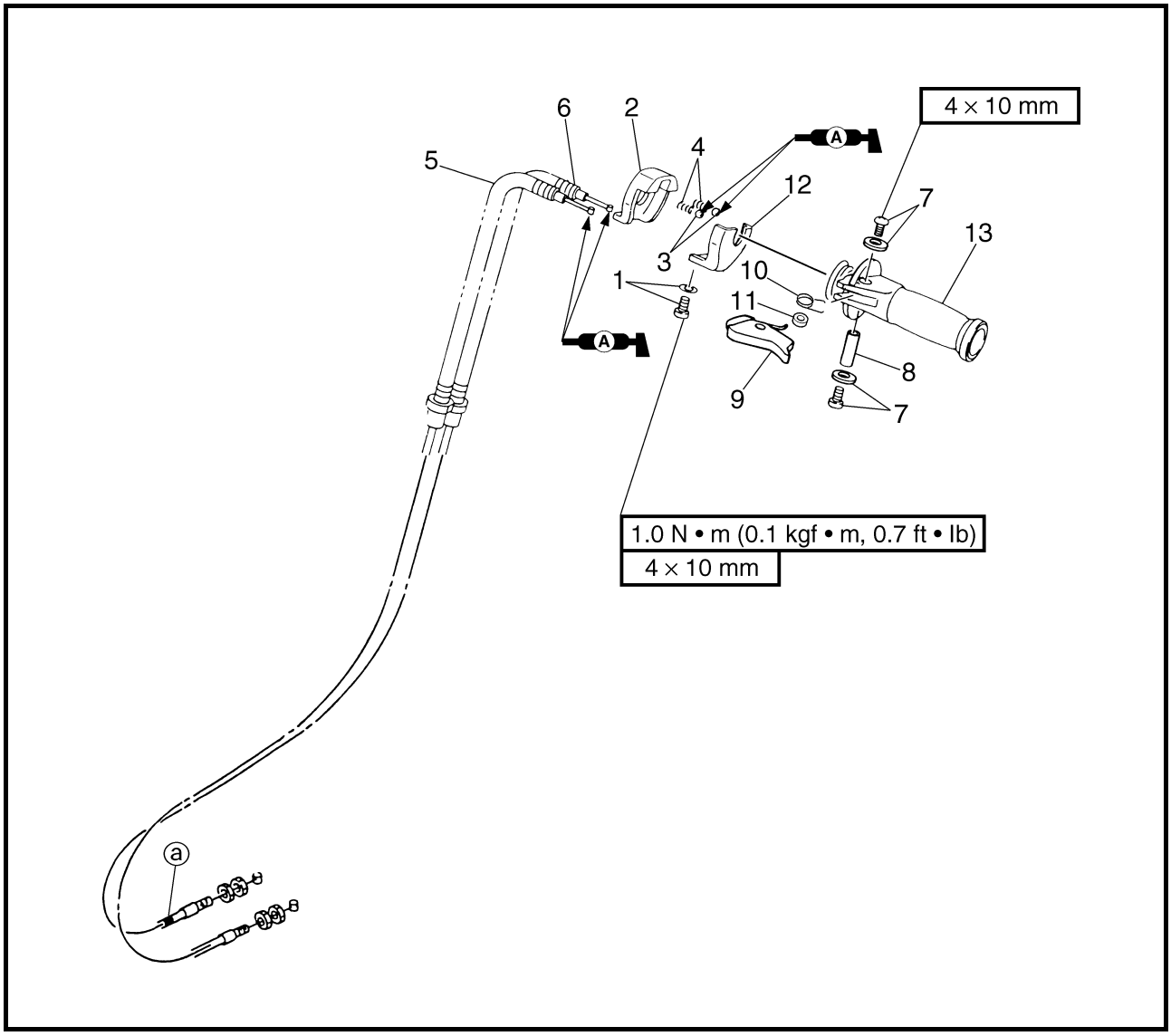
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	QSTS GRIP DISASSEMBLY		Follow the left "Step" for disassembly.
	QSTS grip assembly		Refer to "HANDLEBAR."
1	Screw/washer	1/1	
2	Cover	1	
3	Ball	2	
4	Spring	2	
5	QSTS cable 1	1	
6	QSTS cable 2	1	Cable 2 is identifiable by the white tape ⓐ wrapped around it.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Screw/washer	2/2	
8	Collar	1	
9	QSTS shift lock lever	1	
10	Spring	1	
11	Spacer	1	
12	QSTS cable housing cover	1	
13	QSTS shift grip	1	
			Reverse the disassembly steps for assembly.

SERVICE POINTS

QSTS cable inspection

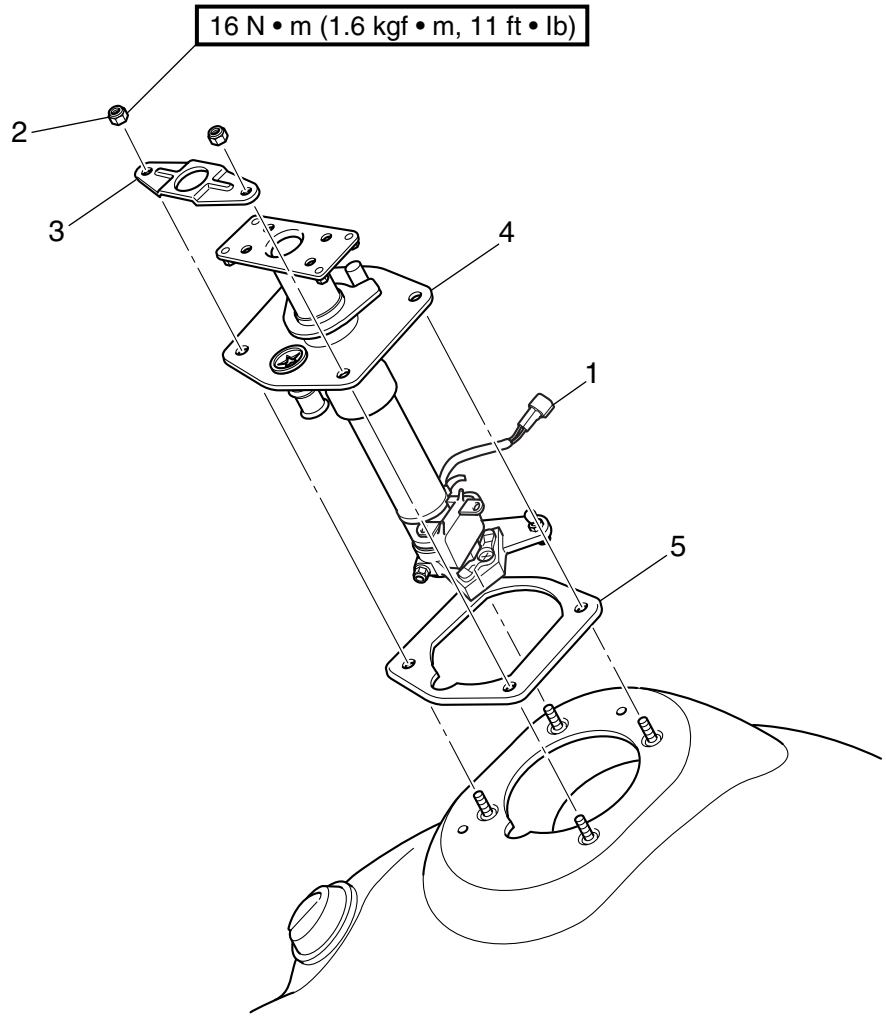
1. Check:
   - QSTS cables
     Frays/kinks/rough movement → Replace.

QSTS grip inspection

1. Check:
   - QSTS grip
     Damage/wear → Replace.

STEERING COLUMN

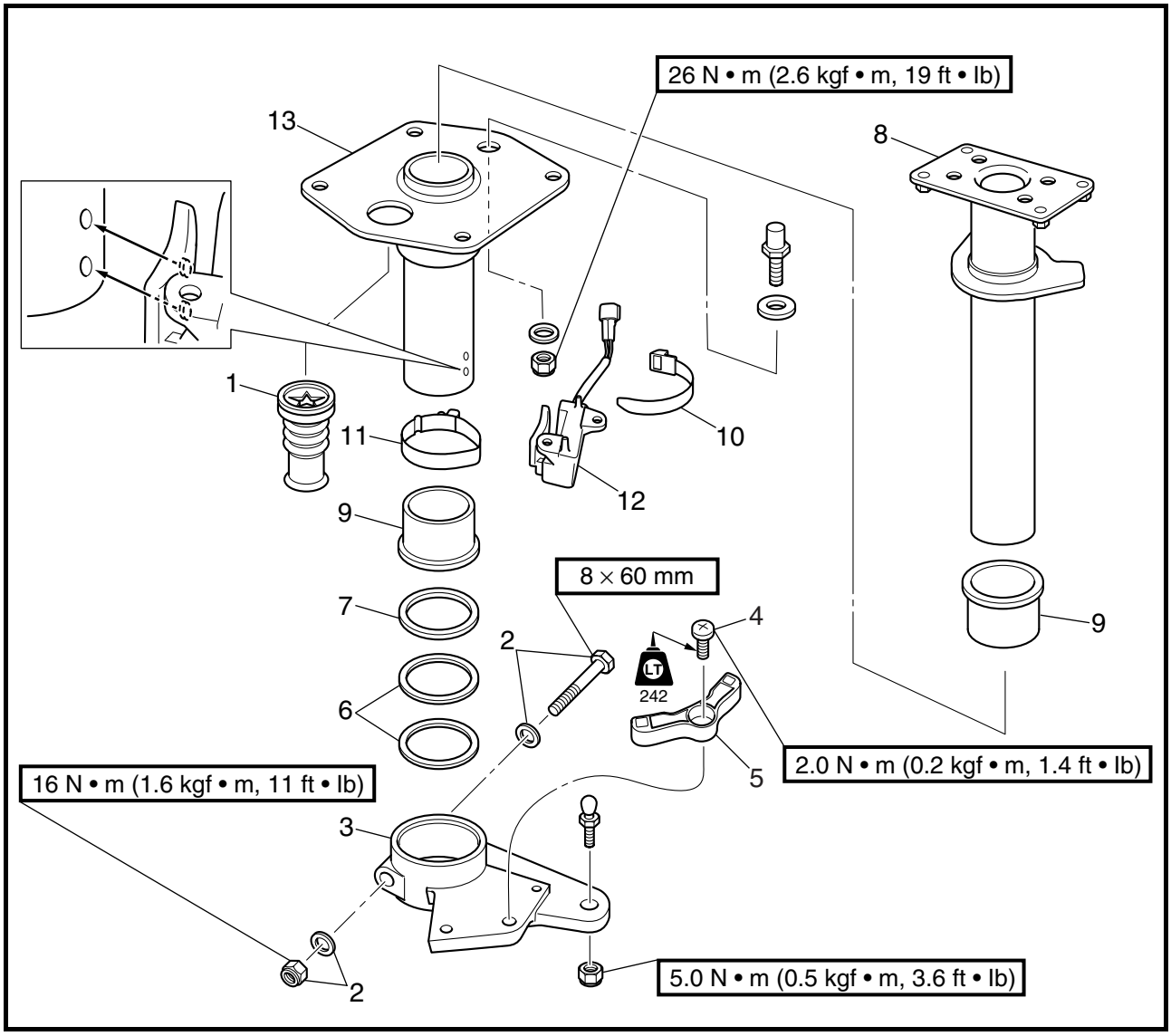
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STEERING COLUMN REMOVAL		Follow the left "Step" for removal.
	Steering console cover assembly		Refer to "STEERING CONSOLE COVER."
	Steering cable end		Refer to "REMOTE CONTROL CABLES AND SPEED SENSOR LEAD."
1	Steering switch coupler	1	
2	Nut	4	
3	Plate	1	
4	Steering column assembly	1	
5	Rubber seal	1	
			Reverse the removal steps for installation.

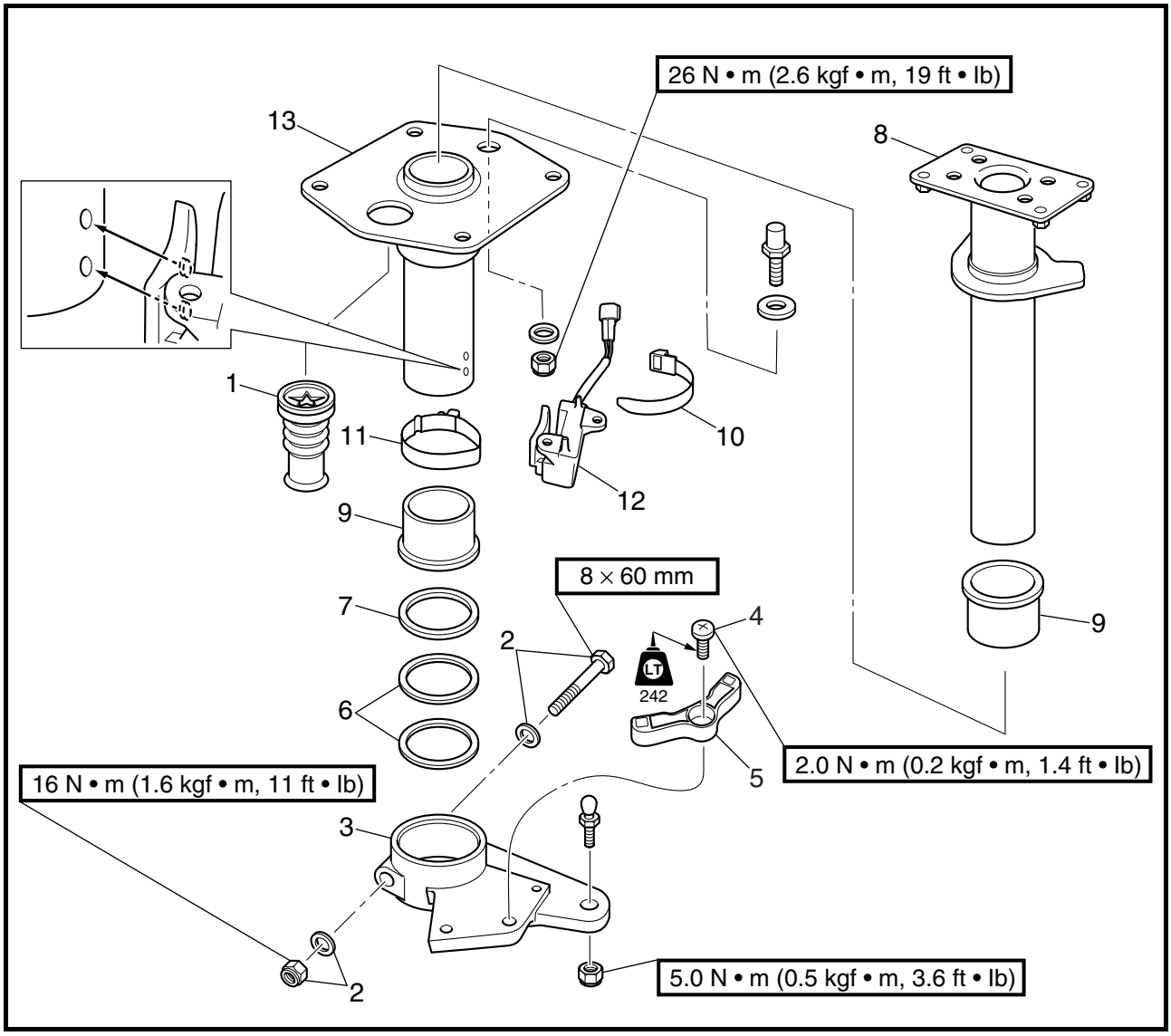
EXPLODED DIAGRAM



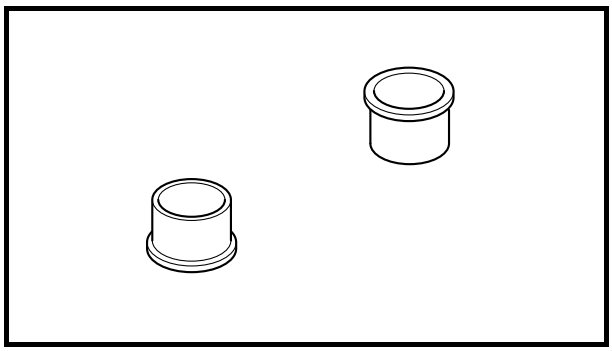
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STEERING COLUMN DISASSEMBLY		Follow the left "Step" for disassembly.
1	Grommet	1	
2	Bolt/washer/nut	1/2/1	
3	Steering arm	1	
4	Screw	1	
5	Magnet	1	
6	Shim	—	Install the same number of shims installed originally at the factory.
7	Washer	1	
8	Steering column	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Bushing	2	
10	Plastic tie	1	
11	Screw clamp	1	
12	Steering switch	1	
13	Steering column housing	1	
			Reverse the disassembly steps for assembly.

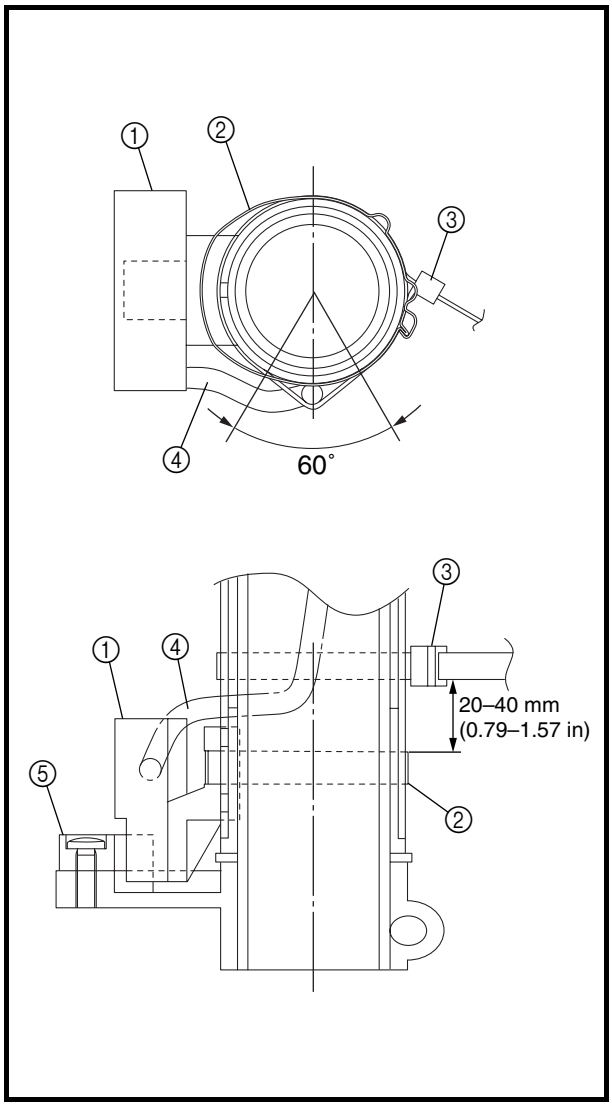


SERVICE POINTS

Steering column bushing inspection

1. Check:
   - Bushings
     Damage/wear → Replace.

2. Check:
   - Steering column
     Refer to "CONTROL SYSTEM" in Chapter 3.



Steering column assembly

1. Install:
   - Steering switch ①
   - Screw clamp ②
   - Plastic tie ③

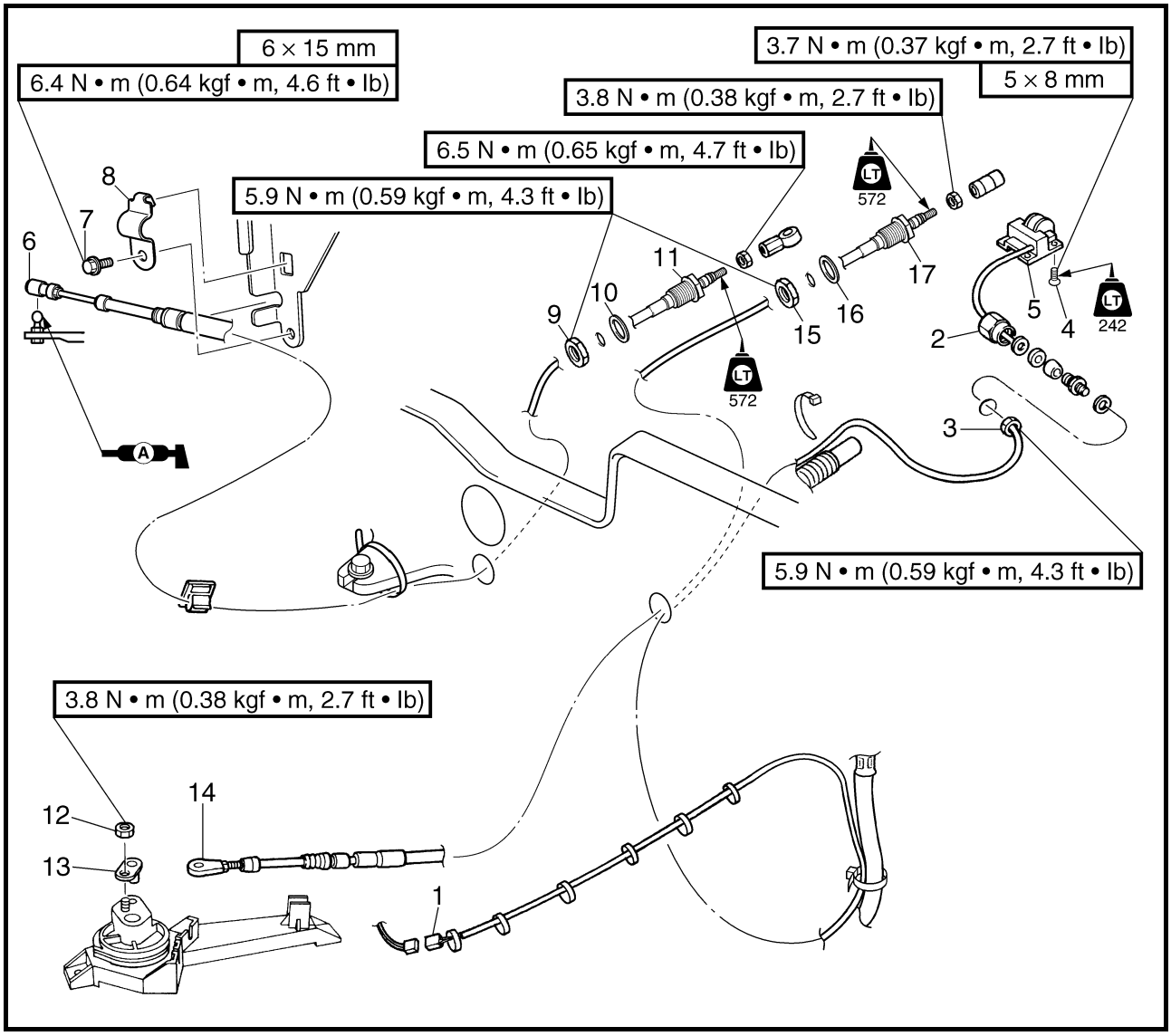
NOTE:
Fasten the steering switch lead ④ with the plastic tie ③ as shown in the illustration.

2. Install:
   - Bushings
   - Steering column
   - Washer
   - Shim(s)
   - Magnet
   - Screw
   - Steering arm
   - Bolt
   - Washers
   - Nut

CAUTION:
Make sure that the steering switch and magnet ⑤ do not contact each other.

REMOTE CONTROL CABLES AND SPEED SENSOR LEAD

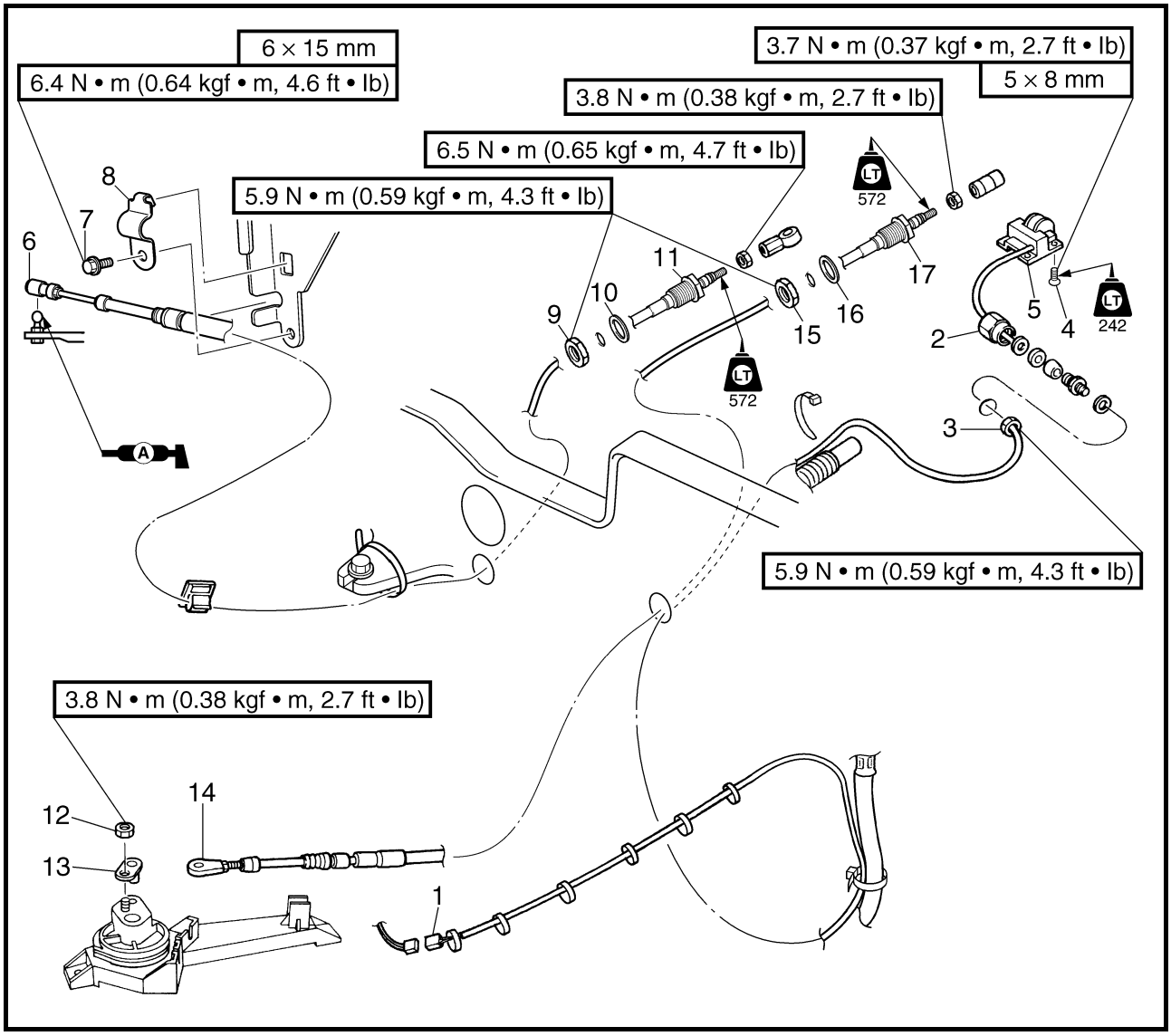
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	REMOTE CONTROL CABLES AND SPEED SENSOR LEAD REMOVAL		Follow the left "Step" for removal.
1	Speed sensor coupler	1	
2	Cap	1	
3	Nut	1	
4	Screw	4	
5	Speed sensor	1	
6	Steering cable end	1	
7	Bolt	1	
8	Steering cable holder	1	
9	Nut	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
10	Seal	1	
11	Steering cable	1	
12	Nut	1	
13	Pin	1	
14	QSTS cable end	1	
15	Nut	1	
16	Seal	1	
17	QSTS cable	1	
			Reverse the removal steps for installation.

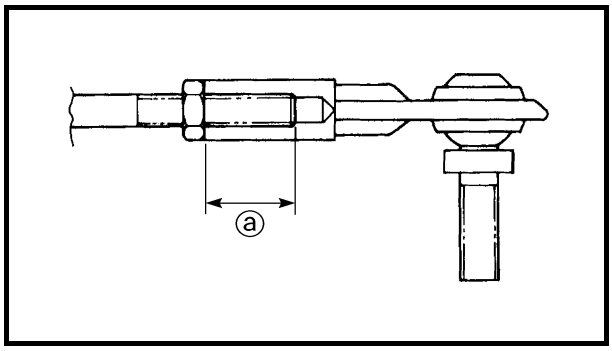
SERVICE POINTS

⚠ WARNING

When routing the cables, do not grasp the cable by the outer crimped sheath or steel end. This could deform or loosen the cable end due to extreme angles and or pressure. Always hold the cables by the bracket or outer cover below the crimp.
If a cable becomes damaged, replace it. Never attempt to repair a damaged cable.

Remote control cable inspection

1. Check:
   - Steering cable
   - QSTS cable
     Frays/kinks/rough movement → Replace.



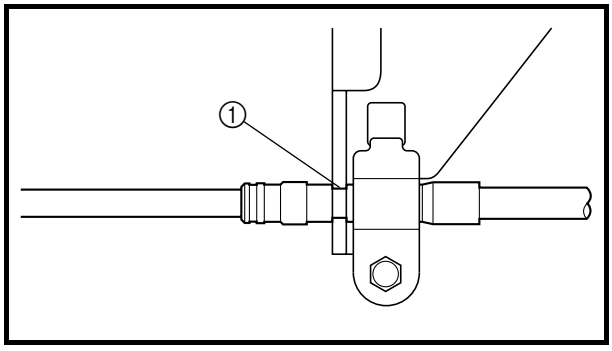
Steering cable installation

1. Install:
   - Steering cable (jet pump end)

Steering cable set length ⓐ (jet pump end):
13.5–15.5 mm (0.53–0.61 in)

⚠ WARNING

The steering cable must be screwed in a minimum of 8 mm (0.31 in).

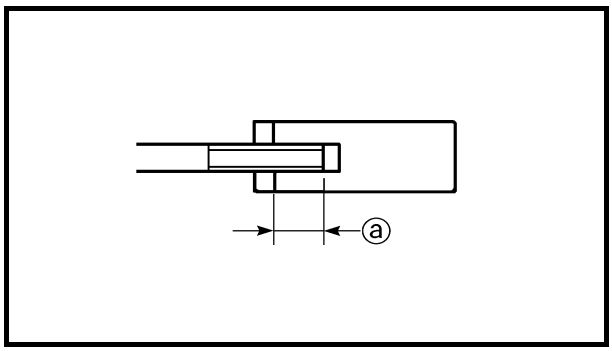


Steering cable stopper installation

1. Install:
   - Steering cable stopper

⚠ WARNING

Be sure to fit the steering cable into the groove ① in the steering cable bracket.



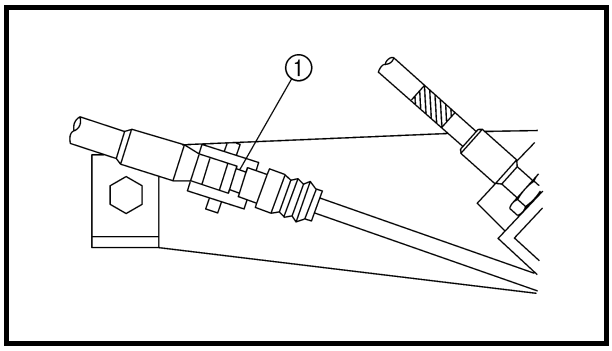
QSTS cable installation

1. Install:
   - QSTS cable (jet pump end)

QSTS cable set length ⓐ (jet pump end):
12.0–14.0 mm (0.47–0.55 in)

⚠ WARNING

The QSTS cable must be screwed in a minimum of 8 mm (0.31 in).



QSTS cable stopper installation

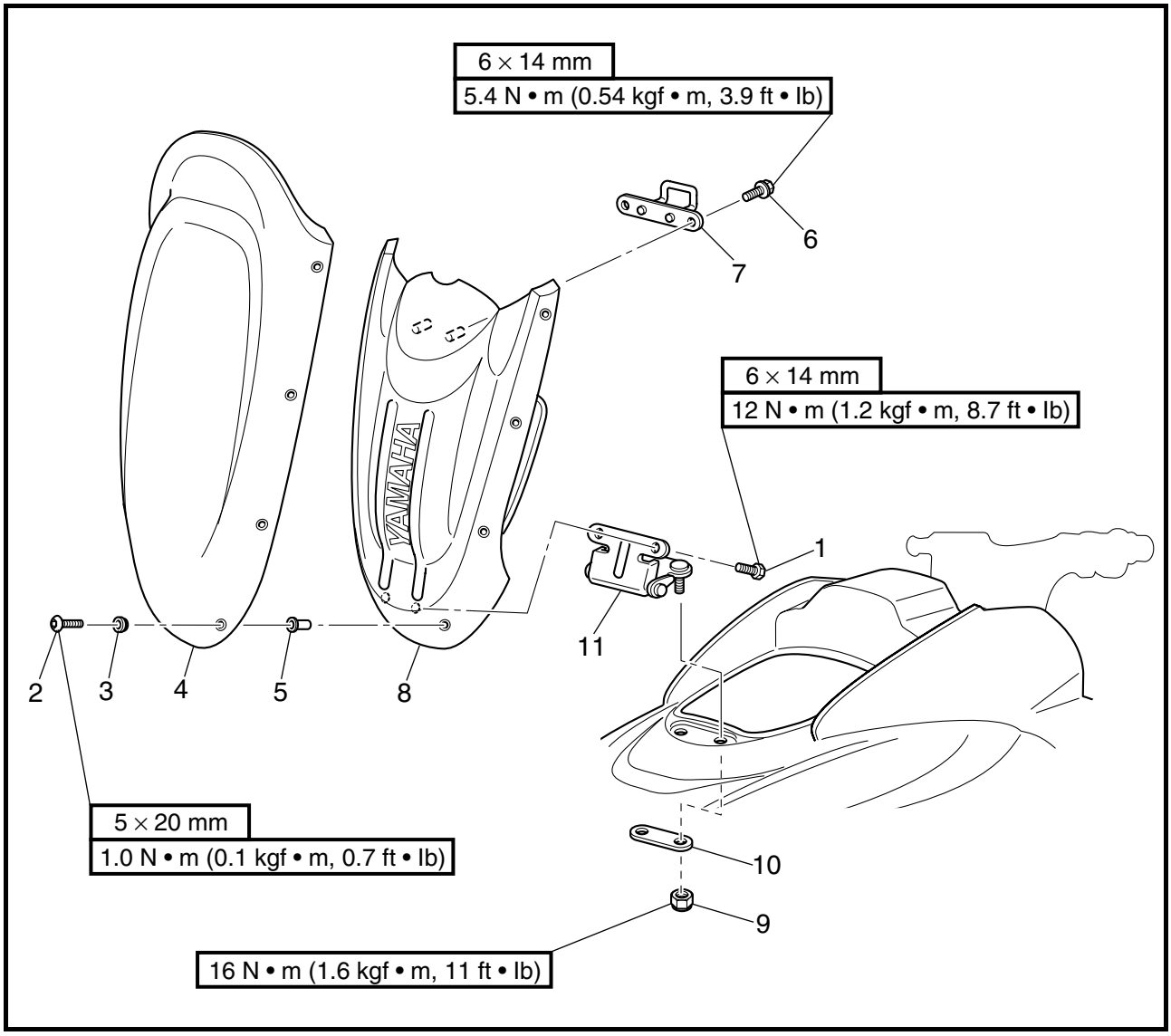
1. Install:
   - QSTS cable stopper

⚠ WARNING

Be sure to fit the projection ① on the QSTS cable stopper into the groove in the outer cable.

HOOD

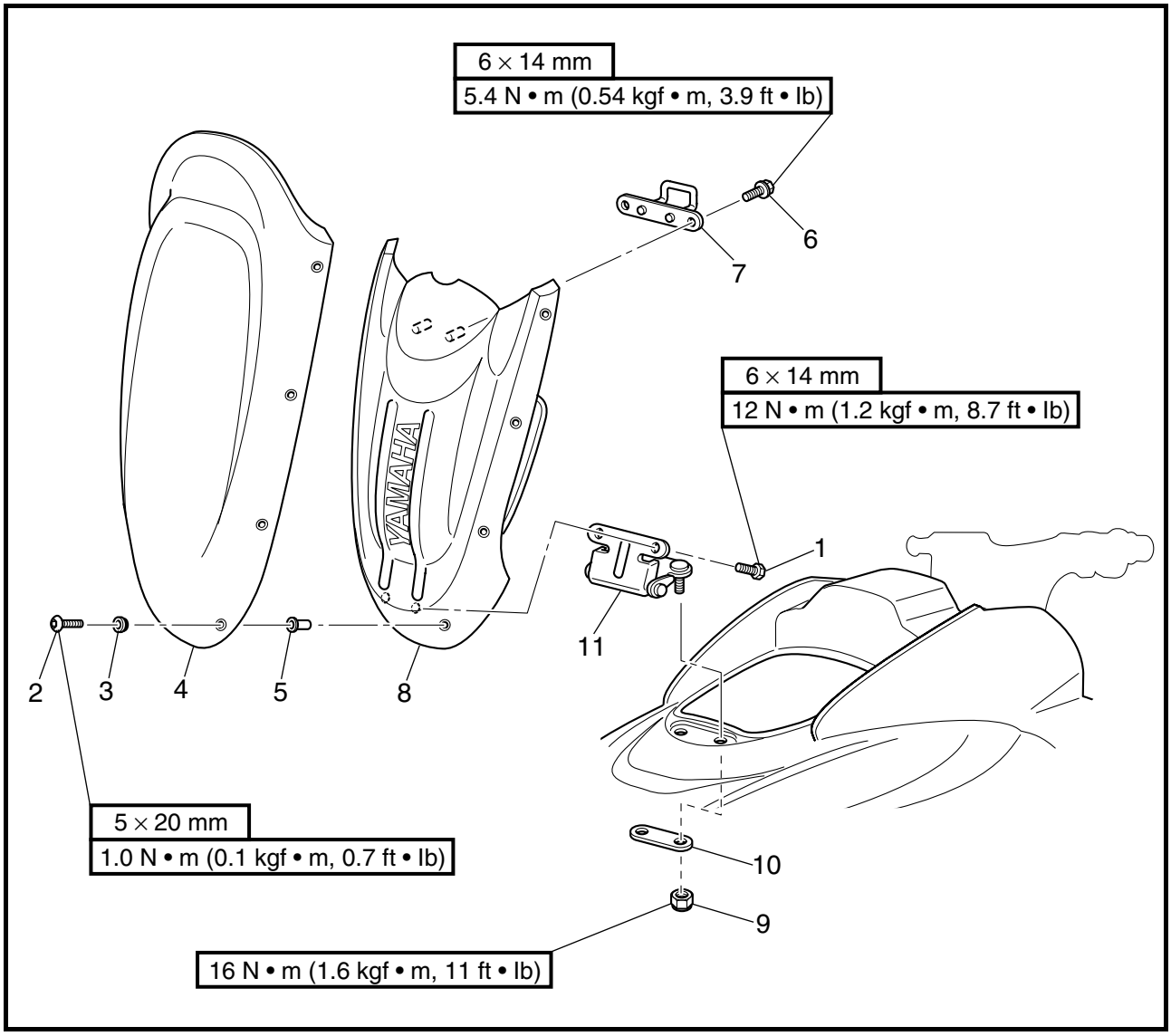
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	HOOD REMOVAL		Follow the left "Step" for removal.
1	Bolt	2	
2	Screw	8	
3	Seal washer	8	
4	Visor	1	
5	Pop nut	8	
6	Bolt	2	
7	Hood lock	1	
8	Hood	1	

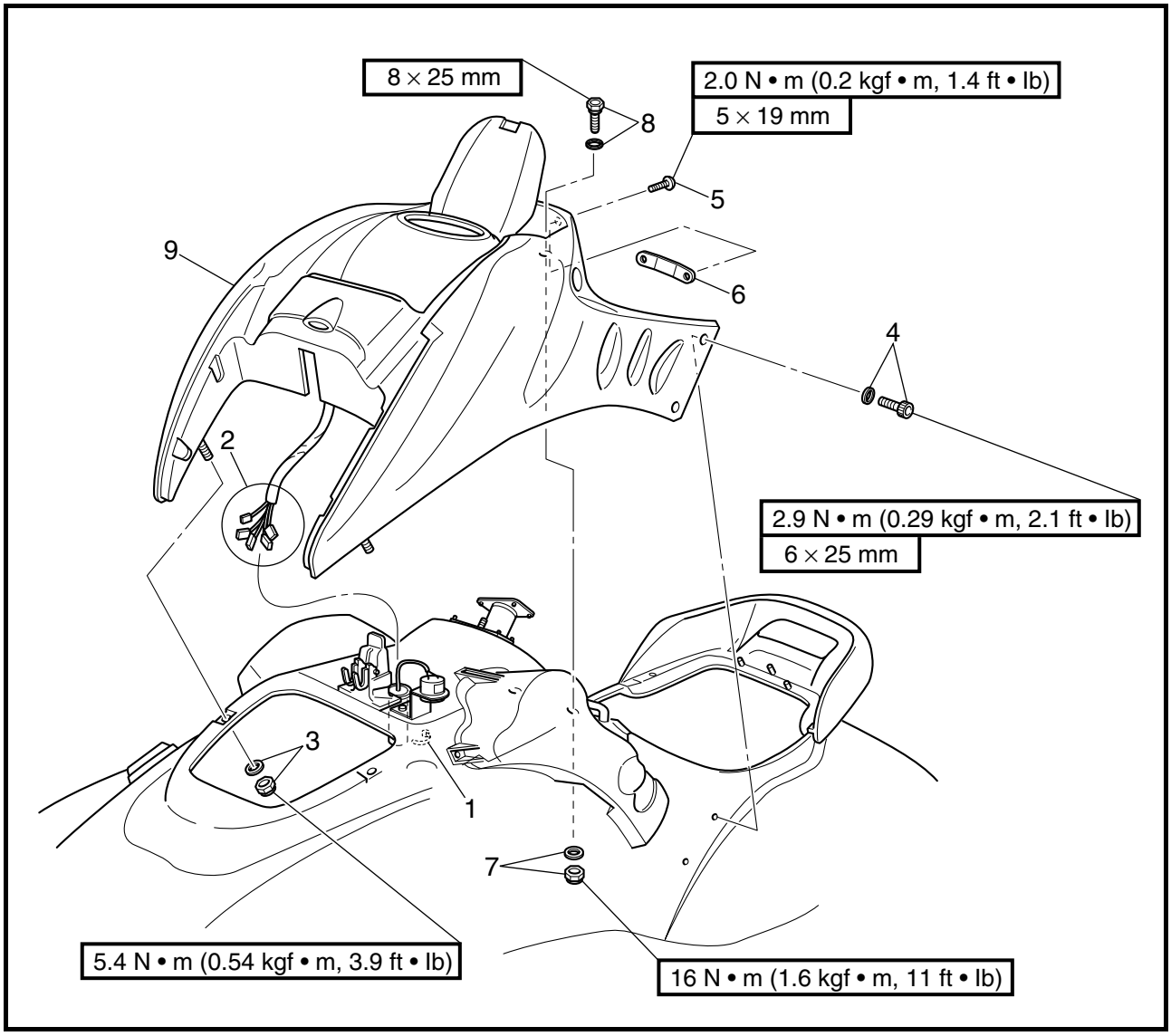
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Nut	2	
10	Plate	1	
11	Hinge assembly	1	
			Reverse the removal steps for installation.

STEERING CONSOLE COVER

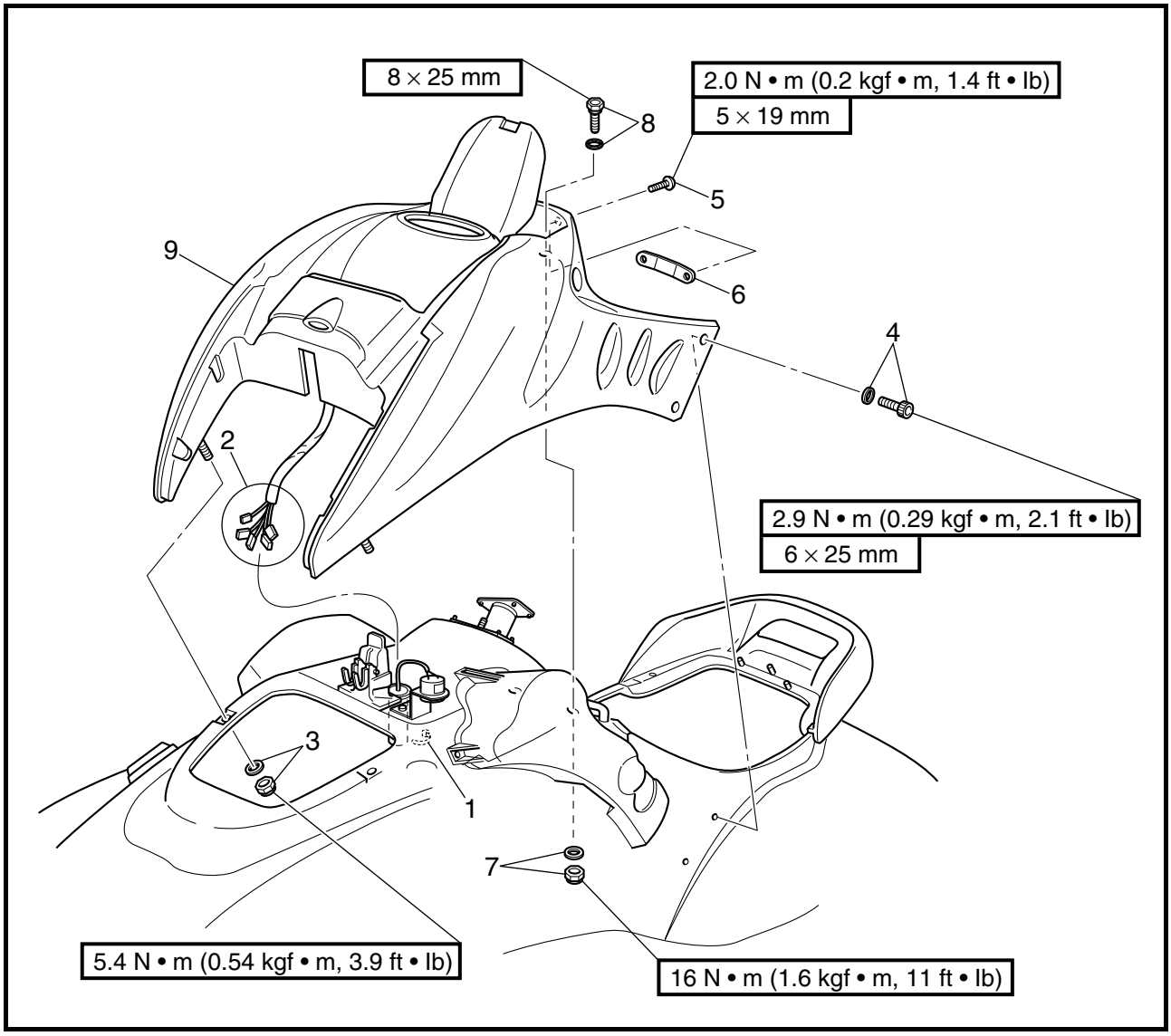
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

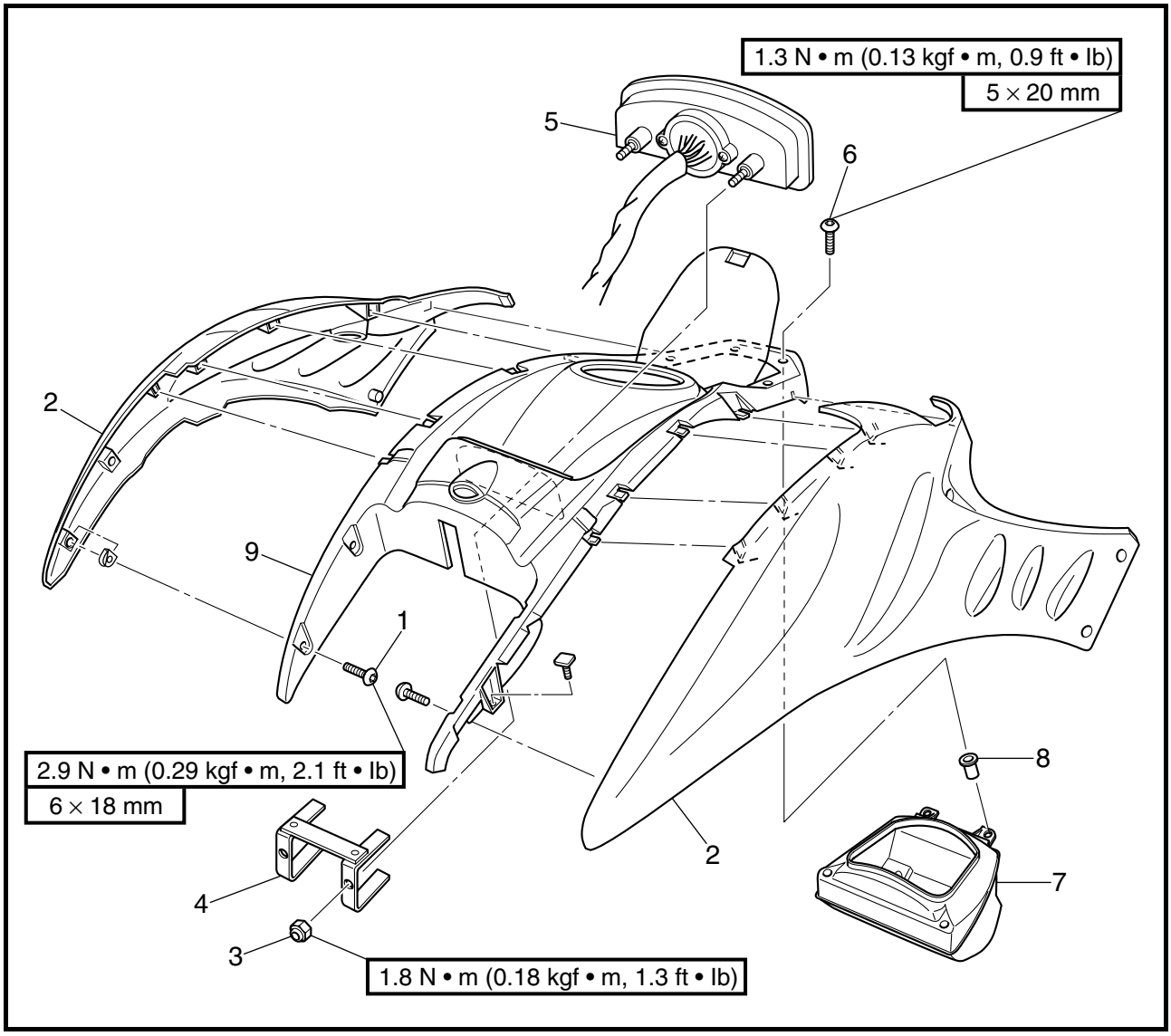
Step	Procedure/Part name	Q'ty	Service points
	STEERING CONSOLE COVER REMOVAL		Follow the left "Step" for removal.
	Handlebar assembly		Refer to "HANDLEBAR."
1	Plastic tie	1	
2	Multifunction meter coupler	5	
3	Nut/washer	2/2	
4	Bolt/washer	4/4	
5	Screw	2	
6	Plate	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Nut/washer	2/2	
8	Bolt/square ring	2/2	
9	Steering console cover assembly	1	**NOTE:** To ease removal, remove the oil filler cap. Reverse the removal steps for installation.

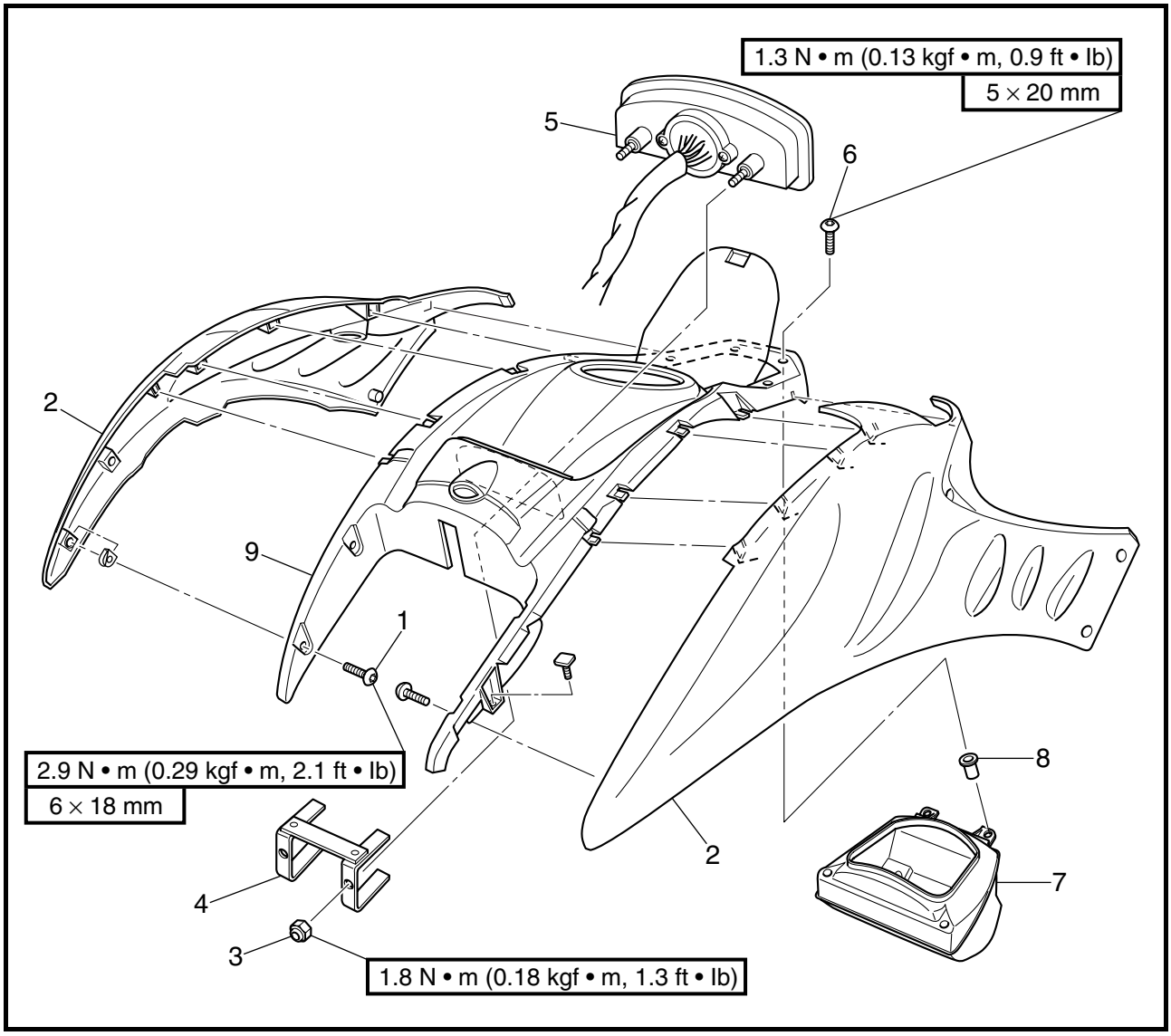
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STEERING CONSOLE COVER DISASSEMBLY		Follow the left "Step" for disassembly.
1	Screw	4	
2	Side cover	2	
3	Nut	2	
4	Holder	1	
5	Multifunction meter	1	
6	Screw	4	

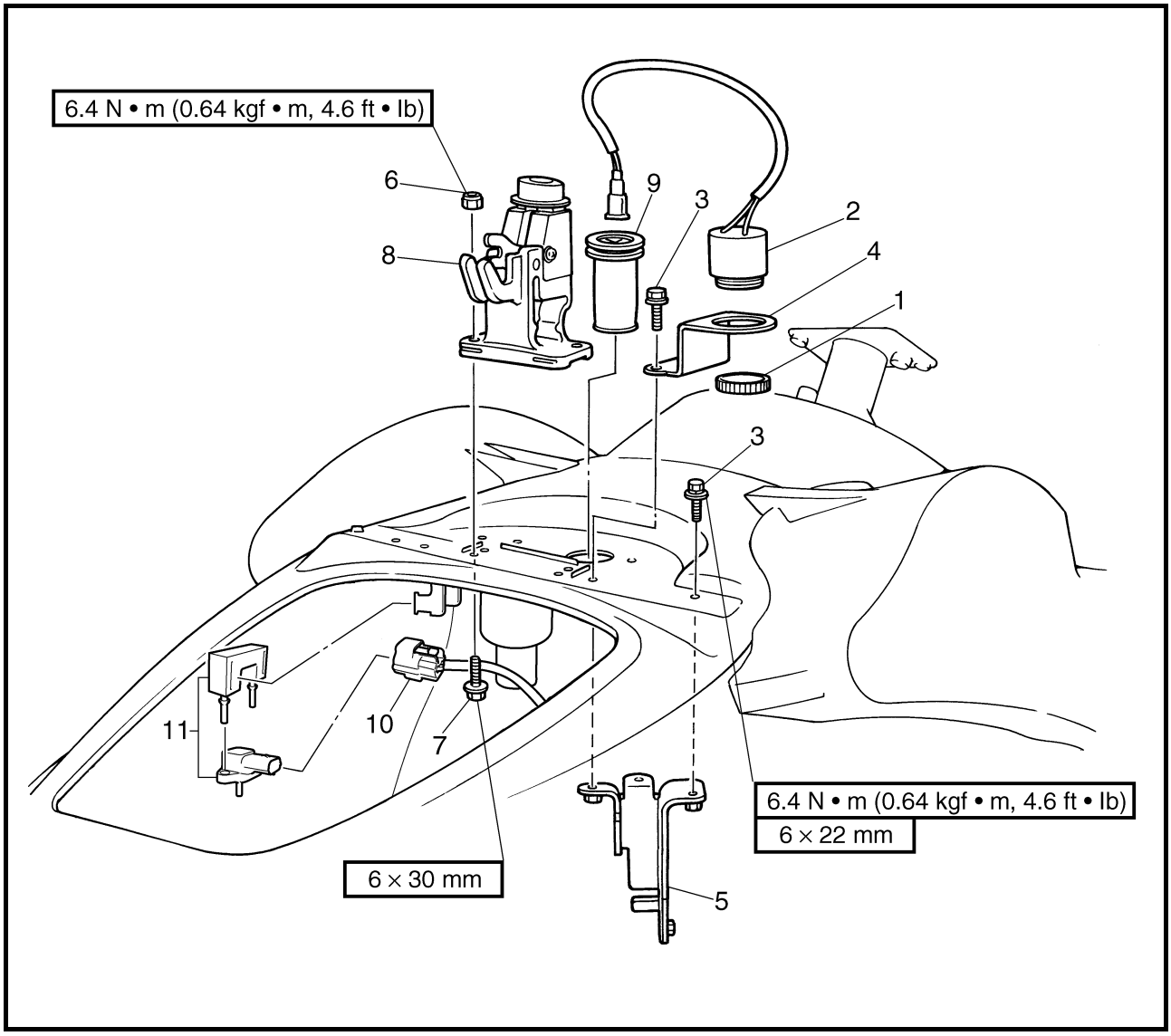
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Glove compartment	1	
8	Pop nut	4	
9	Steering console cover	1	
			Reverse the disassembly steps for assembly.

BUZZER AND HOOD LOCK

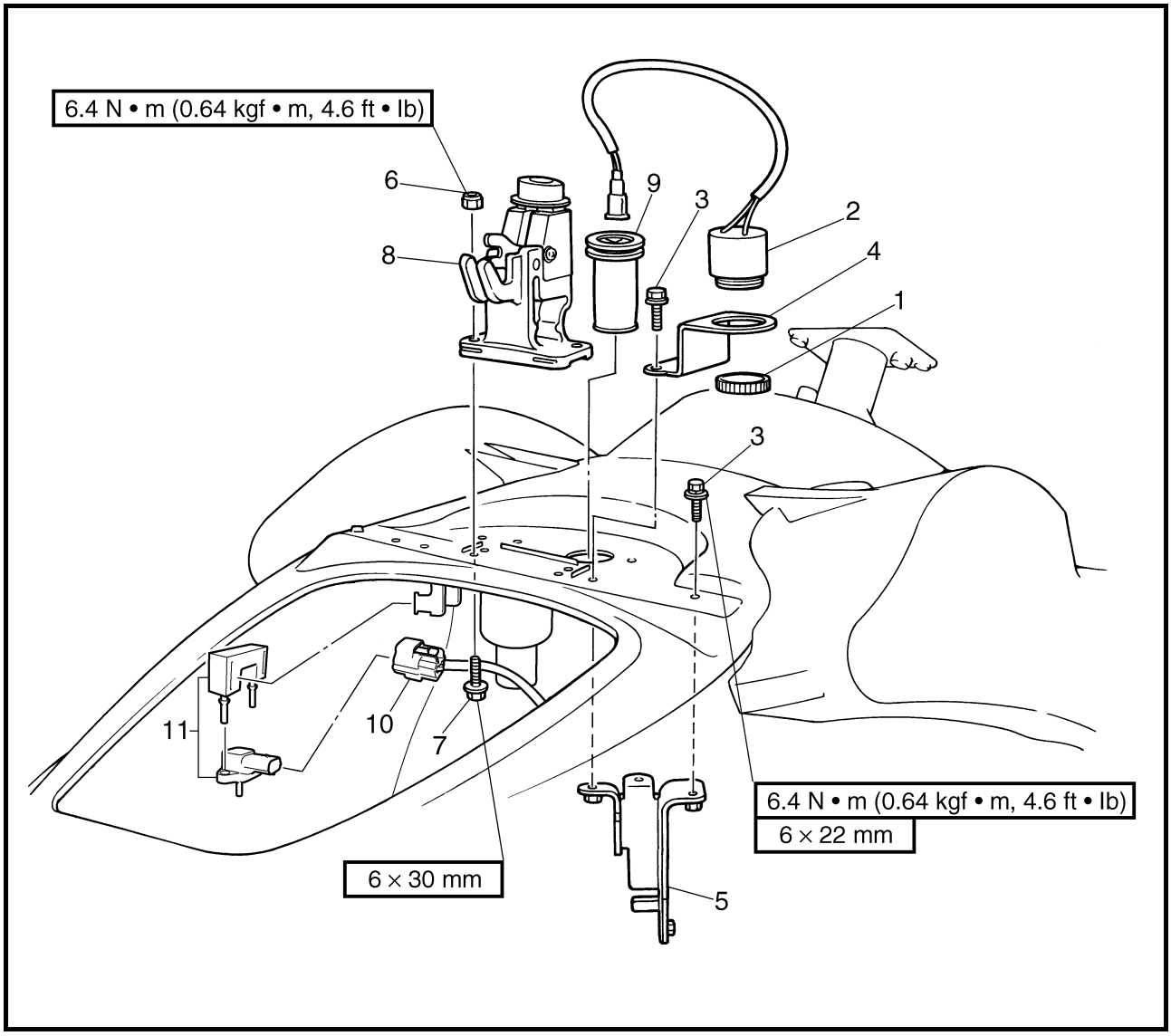
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	BUZZER AND HOOD LOCK REMOVAL		Follow the left "Step" for removal.
	Steering console cover assembly		Refer to "STEERING CONSOLE COVER."
	Steering cable		Refer to "REMOTE CONTROL CABLES AND SPEED SENSOR LEAD."
1	Ring nut	1	
2	Buzzer	1	
3	Bolt	3	
4	Bracket	1	
5	Bracket	1	
6	Nut	2	

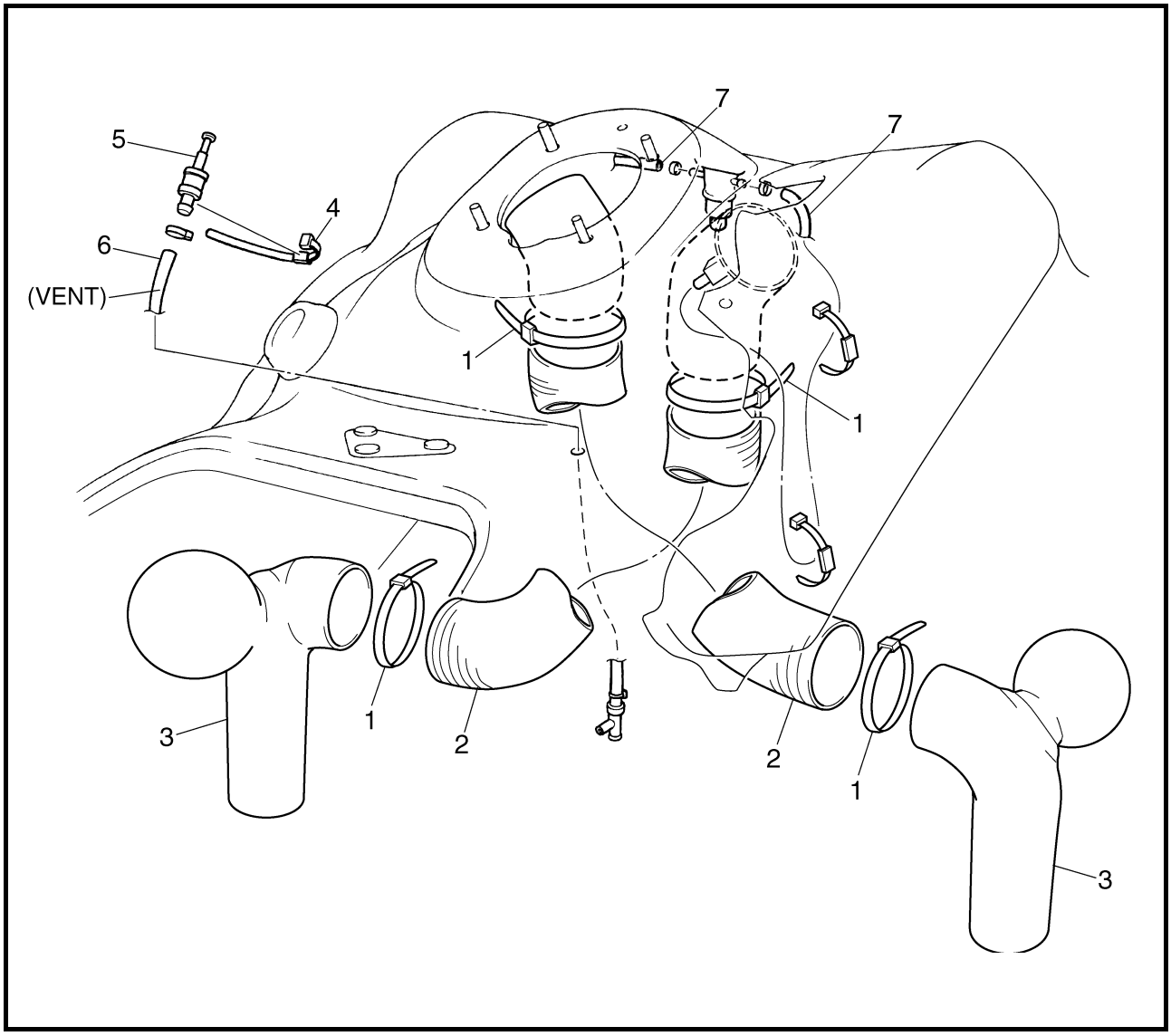
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Bolt	2	
8	Hood lock assembly	1	
9	Grommet	1	
10	Atmospheric pressure sensor coupler	1	
11	Atmospheric pressure sensor	1	
			Reverse the removal steps for installation.

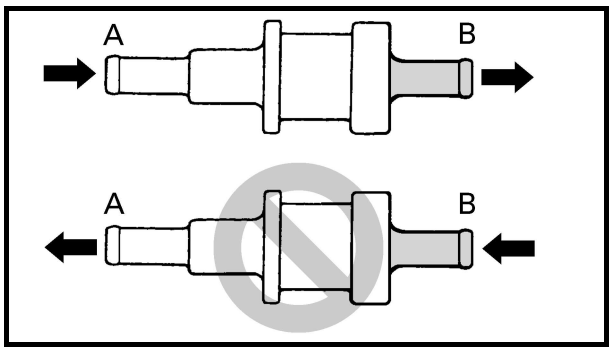
HOSES

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	HOSE REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT" in Chapter 5.
	Steering console cover assembly		Refer to "STEERING CONSOLE COVER."
1	Plastic tie	4	
2	Ventilation hose	2	
3	Ventilation duct	2	
4	Plastic tie	1	
5	Check valve	1	
6	Oil tank breather hose	1	
7	Fuel tank breather hose	2	
			Reverse the removal steps for installation.



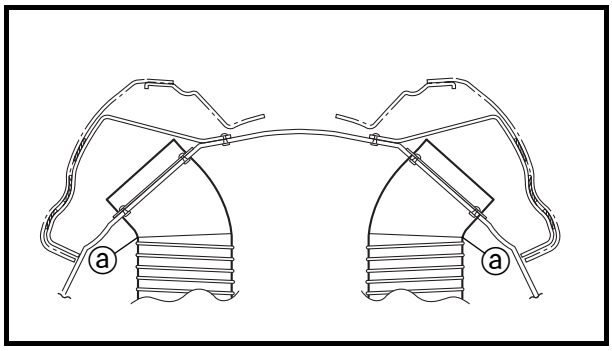
SERVICE POINTS

Check valve inspection

1. Check:
   - Check valve
     Faulty → Replace.

Checking steps:

- Connect a hose to end “A” of the check valve, and then blow into the hose.
  Air should come out from end “B.”
- Connect the hose to end “B” of the check valve, and then blow into the hose.
  Air should not come out from end “A.”



Ventilation hose installation

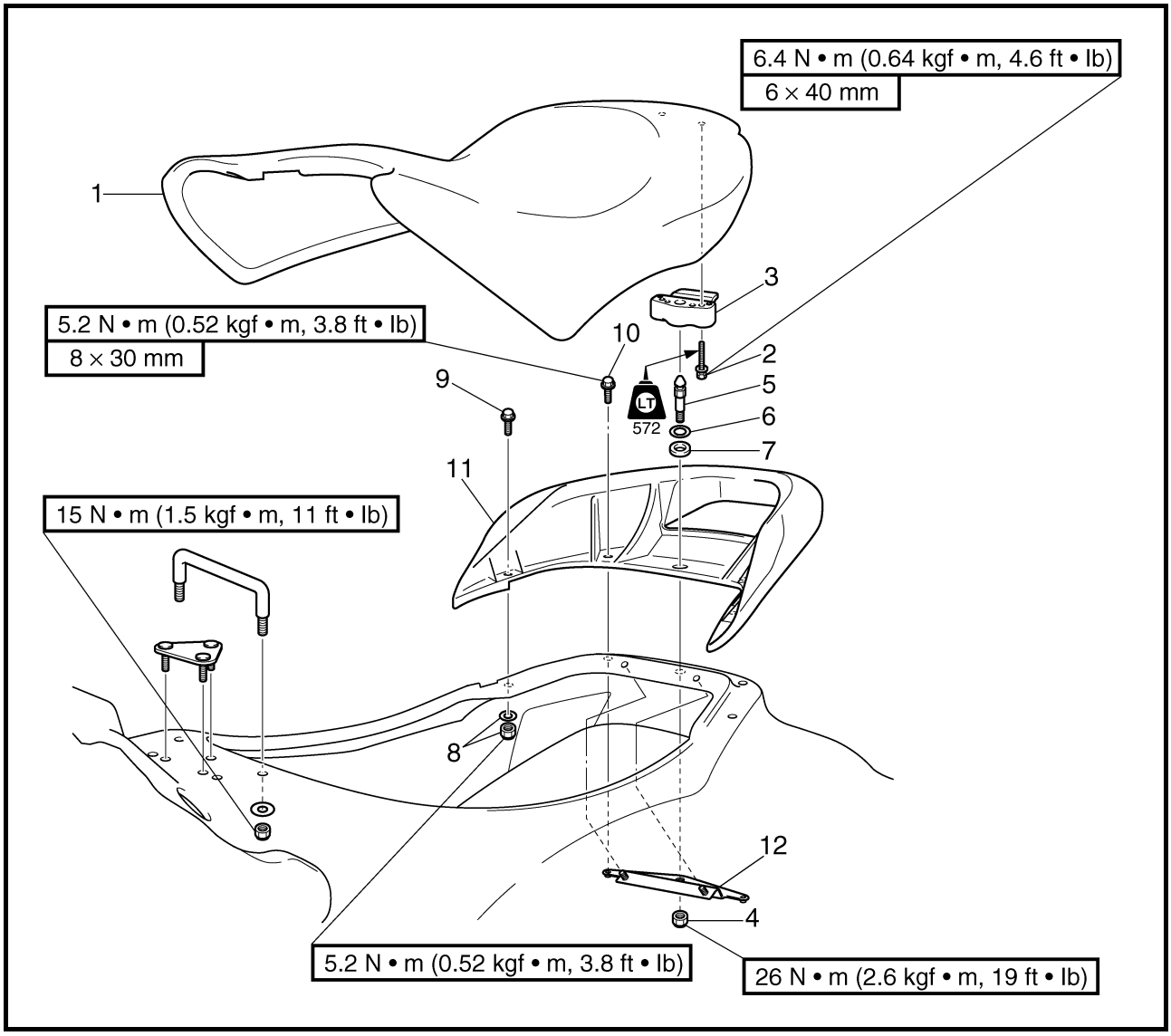
1. Install:
   - Ventilation hose

NOTE:

Insert the ventilation hose into the ventilation fitting until it reaches the bend ⓐ in the fitting.

SEAT AND HANDGRIP

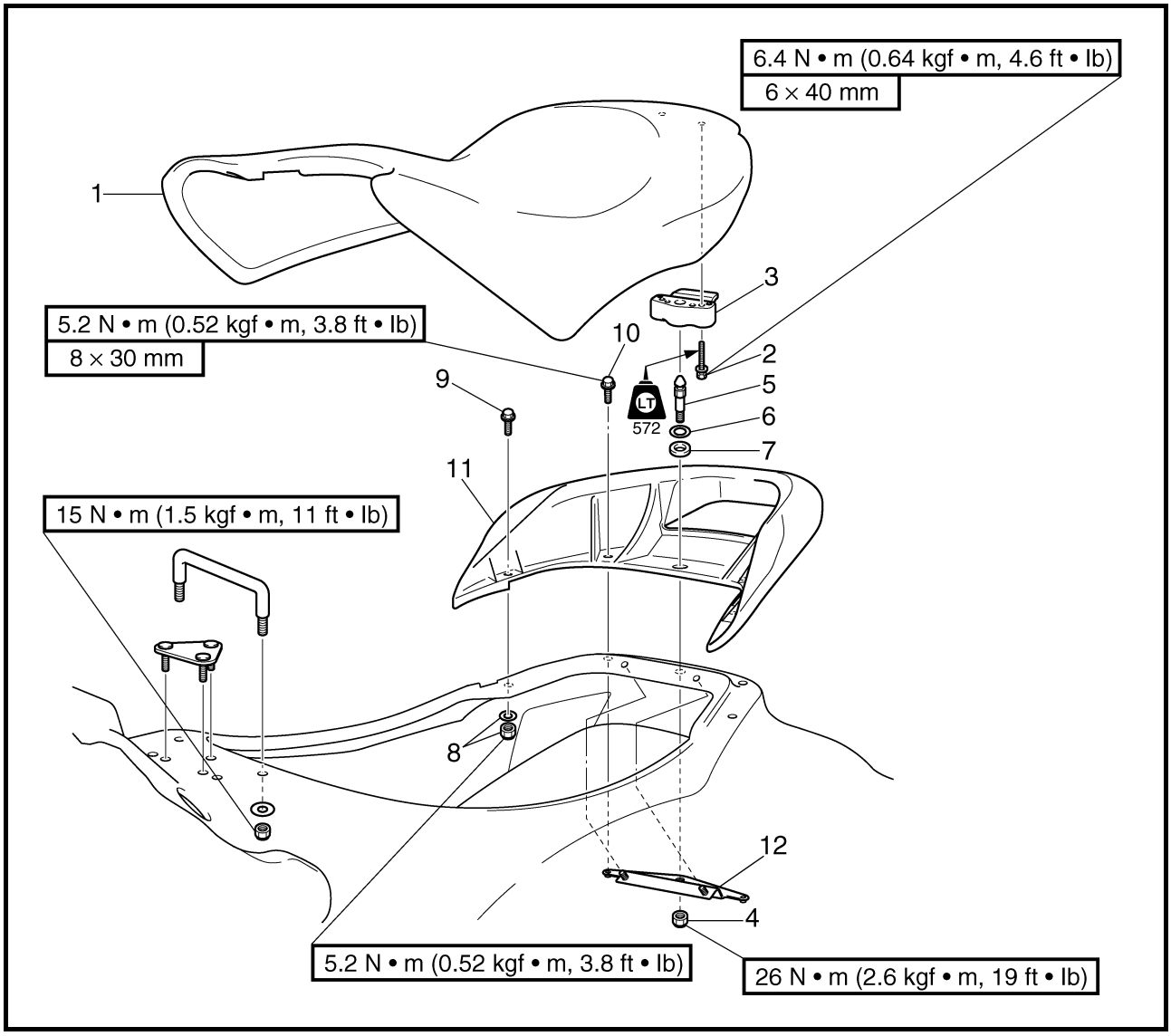
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	SEAT AND HANDGRIP REMOVAL		Follow the left "Step" for removal.
1	Seat	1	
2	Bolt	2	
3	Seat lock	1	
4	Nut	1	
5	Projection	1	
6	Washer	1	
7	Rubber ring	1	
8	Nut/washer	2/2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Bolt	2	
10	Bolt	2	
11	Handgrip	1	
12	Bracket	1	
			Reverse the removal steps for installation.

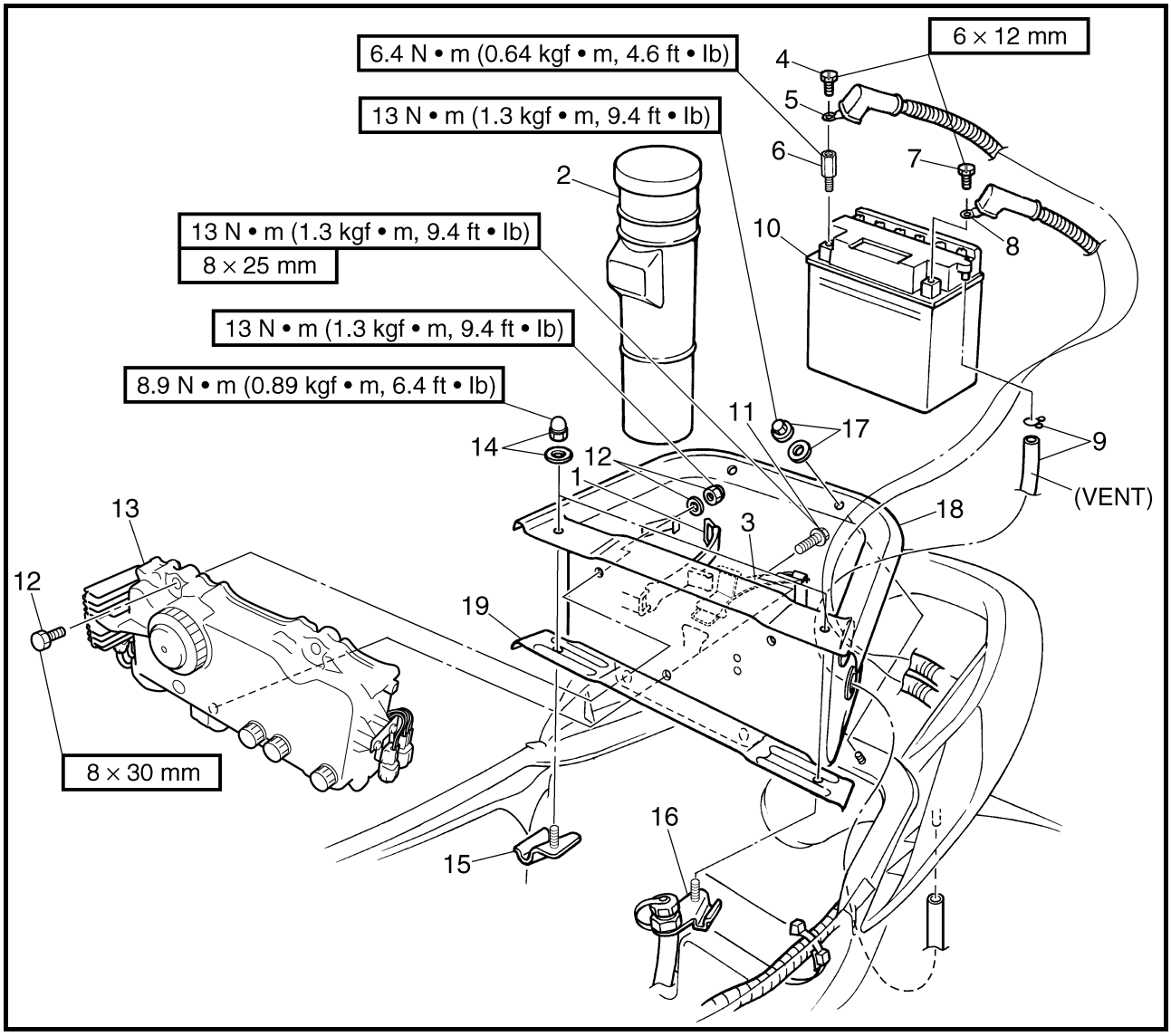
SERVICE POINTS

Seat lock inspection

1. Check:
   - Seat lock
     Damage/wear → Replace.

BATTERY BOX

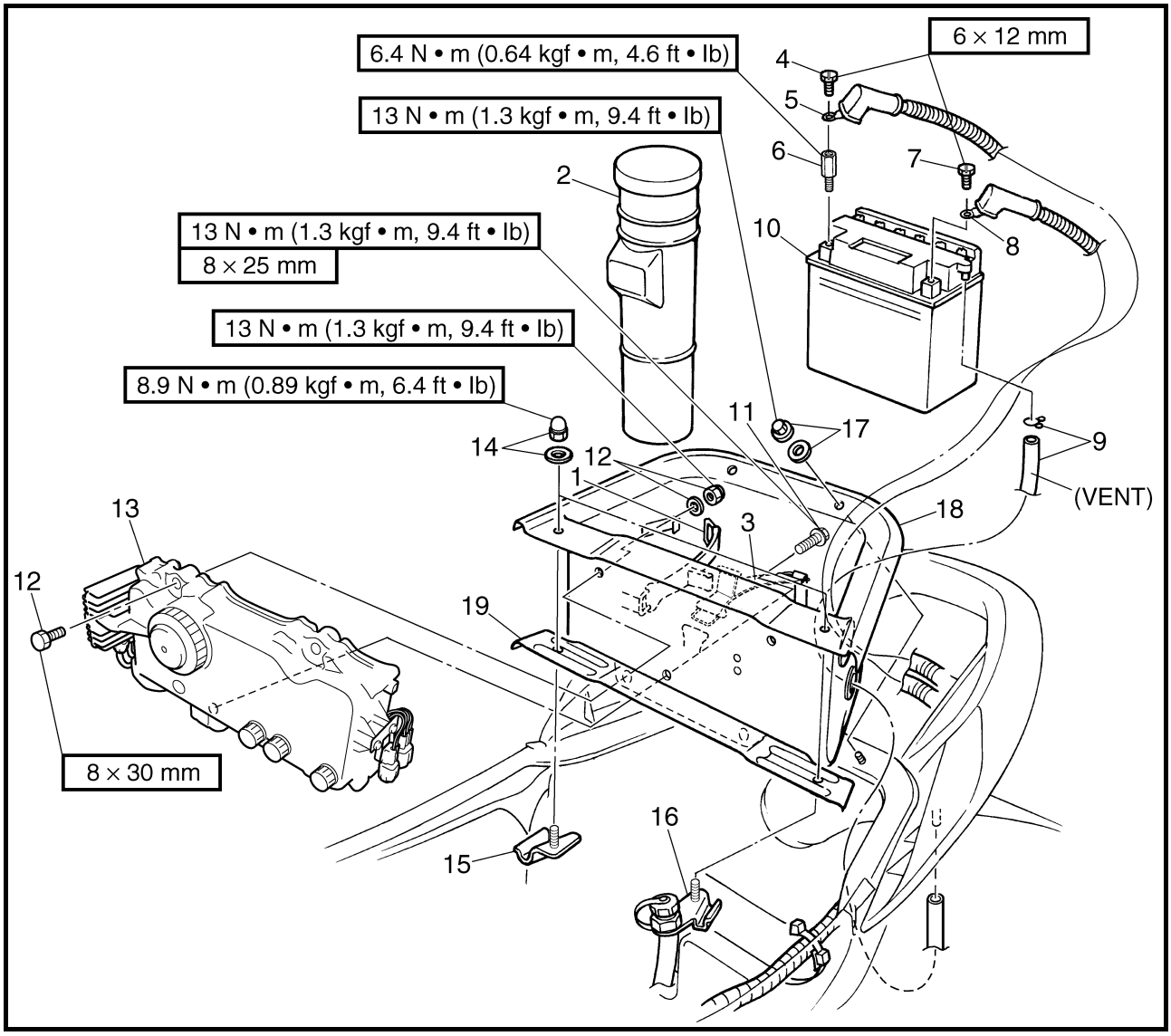
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

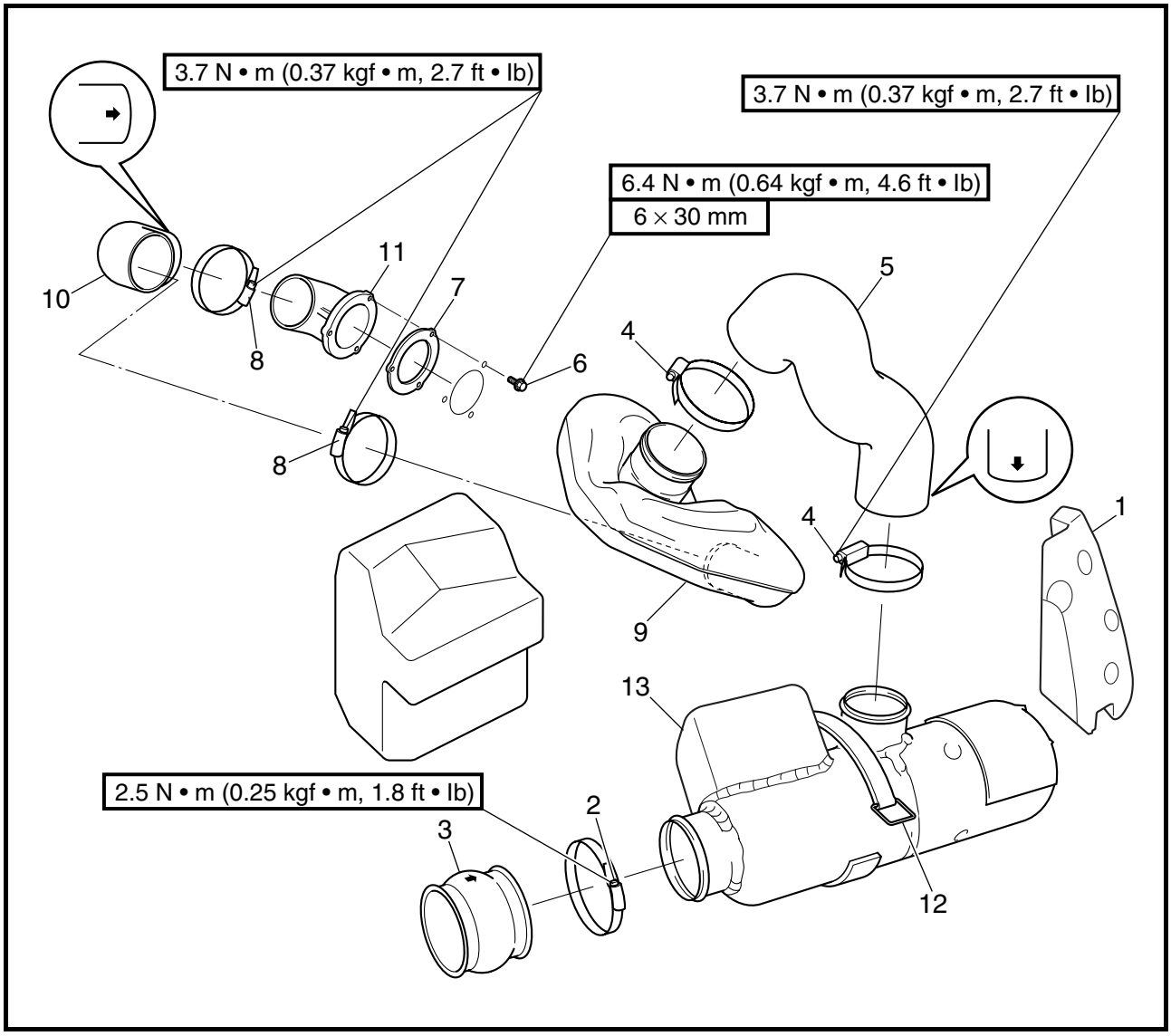
Step	Procedure/Part name	Q'ty	Service points
	BATTERY BOX REMOVAL		Follow the left "Step" for removal.
1	Battery band	1	
2	Fire extinguisher container	1	
3	Battery band	1	
4	Bolt	1	
5	Negative battery lead	1	
6	Terminal extension	1	
7	Bolt	1	
8	Positive battery lead	1	
9	Clip/breather hose	1/1	
10	Battery	1	
11	Bolt	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
12	Cap nut/washer/bolt	2/2/2	
13	Electrical box	1	
14	Cap nut/washer	2/2	
15	Holder	1	
16	Holder	1	
17	Cap nut/washer	2/2	
18	Battery box	1	**NOTE:** Before installing the battery box, route the battery leads and battery breather hose through the holes in the battery box.
19	Stay	1	Reverse the removal steps for installation.

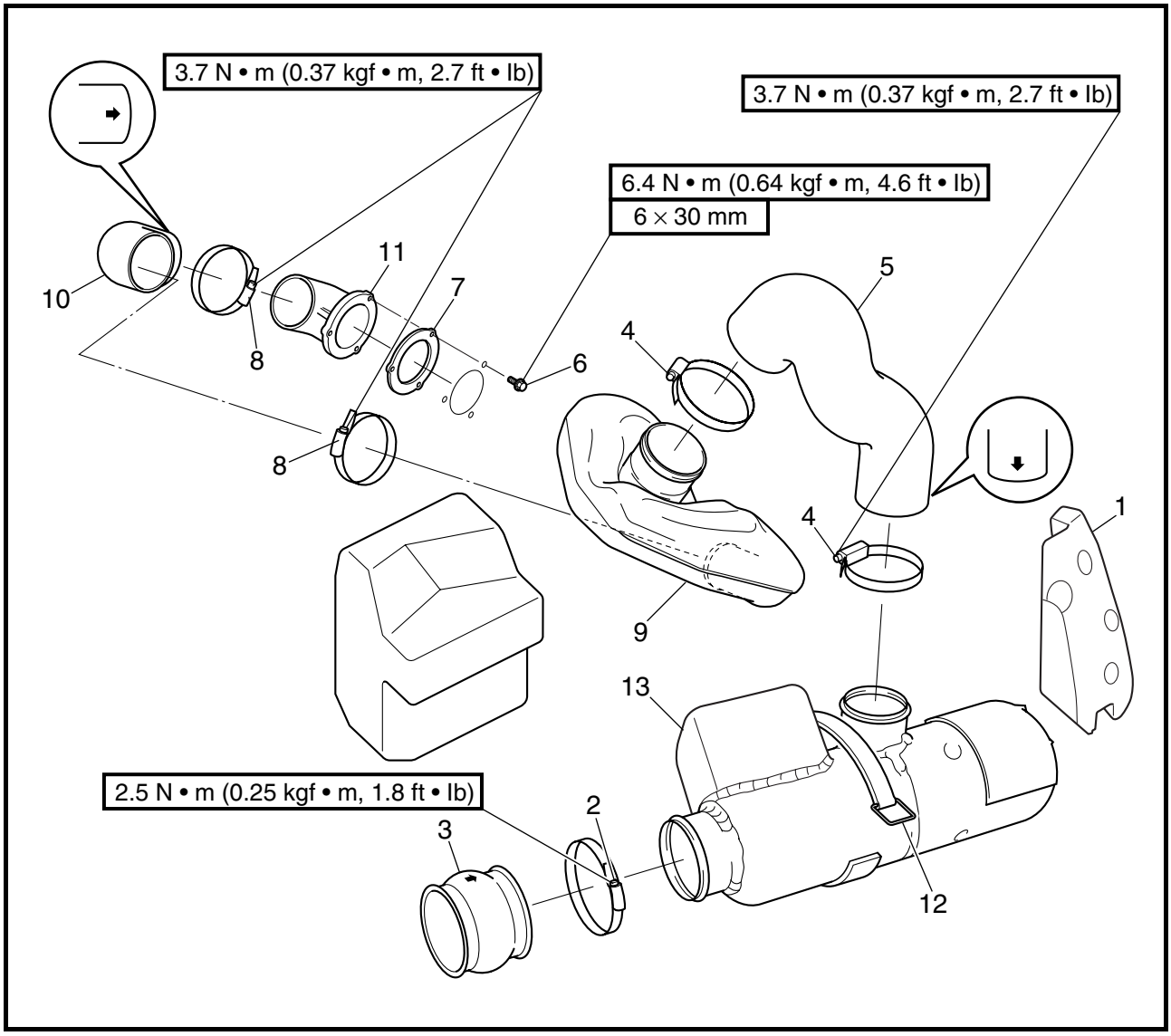
EXHAUST SYSTEM
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	EXHAUST SYSTEM REMOVAL		Follow the left "Step" for removal.
	Battery box		Refer to "BATTERY BOX."
1	Flotation	1	
2	Exhaust joint clamp	1	
3	Exhaust joint	1	
4	Hose screw clamp	2	
5	Rubber hose	1	
6	Bolt	3	
7	Seal	1	

EXPLODED DIAGRAM

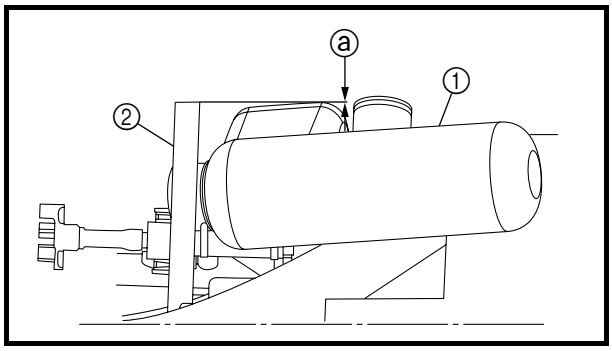


Step	Procedure/Part name	Q'ty	Service points
8	Hose screw clamp	2	**NOTE:**
9	Water tank	1	Remove parts 8 to 11 as a set.
10	Rubber hose	1	
11	Exhaust outlet	1	
12	Water lock band	1	
13	Water lock	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Exhaust system inspection

1. Check:
   - Water lock band
     Cracks/damage → Replace.
2. Check:
   - Rubber hoses
     Burns/cracks/damage → Replace.
3. Check:
   - Water lock
     Cracks/leaks → Replace.
4. Check:
   - Water tank
     Cracks/damage/leaks → Replace.

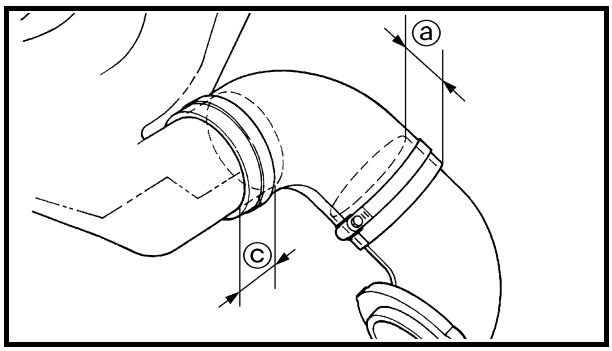


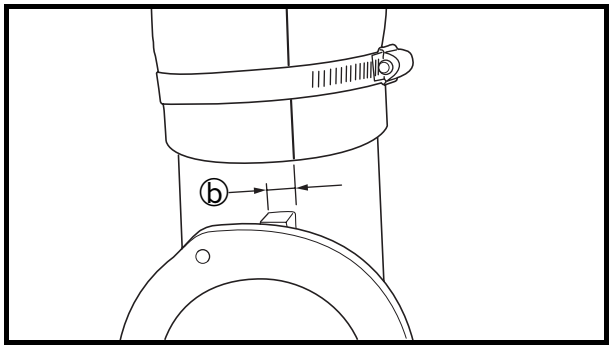
Water lock installation

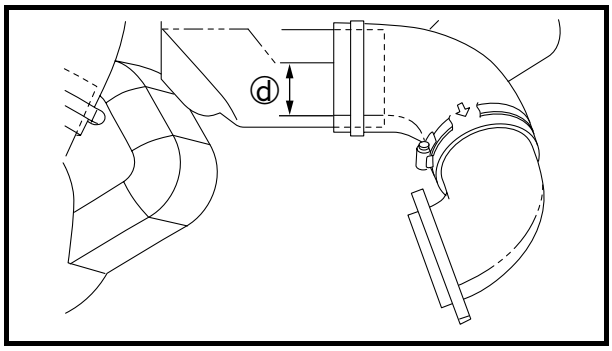
1. Install:
   - Water lock ①
   - Water lock band

NOTE:

Install the water lock so that it is 0–5 mm (0–0.2 in) ⓐ high in relation to the bulkhead ②.





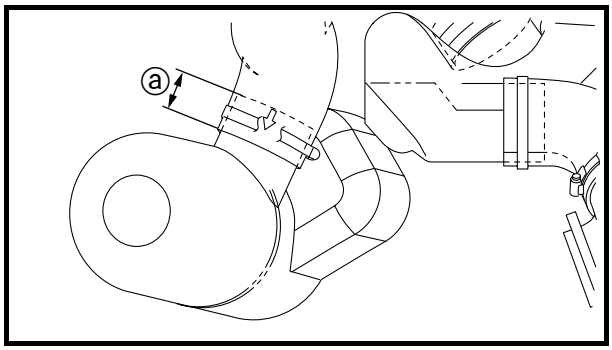


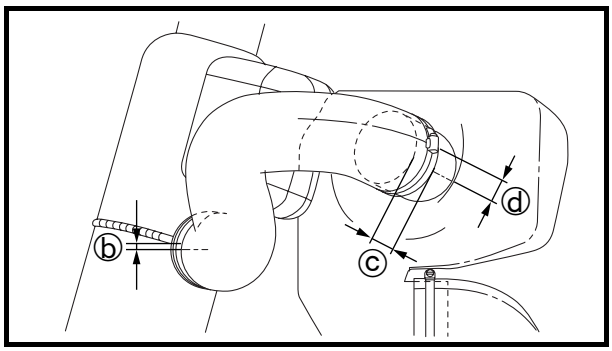
Exhaust component parts assembly

1. Install:
   - Exhaust outlet
   - Rubber hose
   - Water tank

NOTE:

- Insert the exhaust outlet 45–50 mm (1.77–1.97 in) ⓐ into the rubber hose.
- Make sure that there is a distance of 10 mm (0.39 in) ⓑ between the parting lines of the exhaust outlet and the rubber hose.
- Insert the water tank 45–50 mm (1.77–1.97 in) ⓒ into the rubber hose.
- Make sure that there is a distance of 45 mm (1.77 in) ⓓ between the parting lines of the water tank and rubber hose.



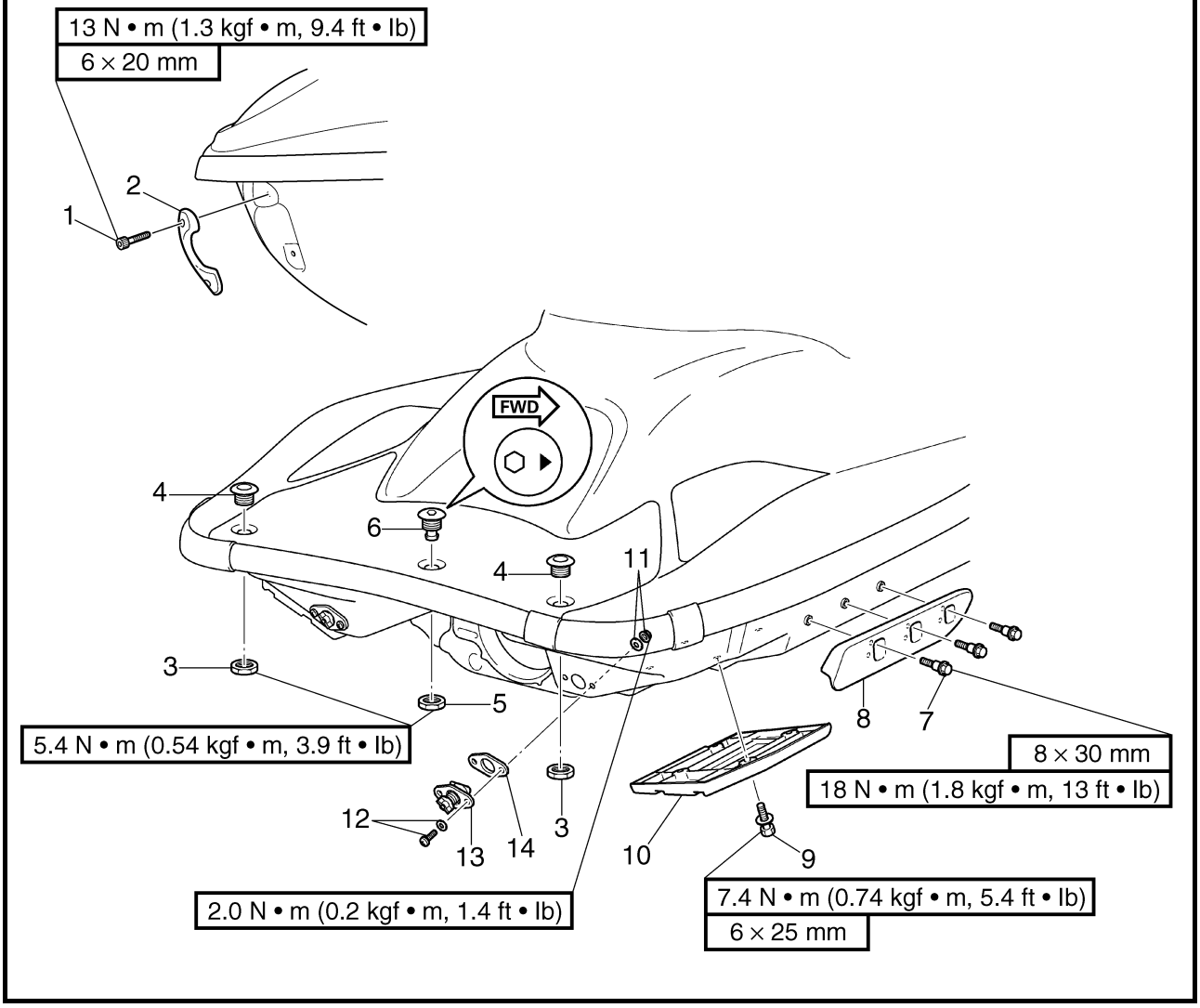


2. Install:
   - Rubber hose

NOTE:

- Install the rubber hose 45–50 mm (1.77–1.97 in) ⓐ into the water lock.
- Make sure that there is a distance of 10 mm (0.39 in) ⓑ between the parting lines of the water lock and the rubber hose.
- Install the rubber hose 45–50 mm (1.77–1.97 in) ⓒ into the water tank.
- Make sure that there is a distance of 30 mm (1.18 in) ⓓ between the parting lines of the water tank and rubber hose.

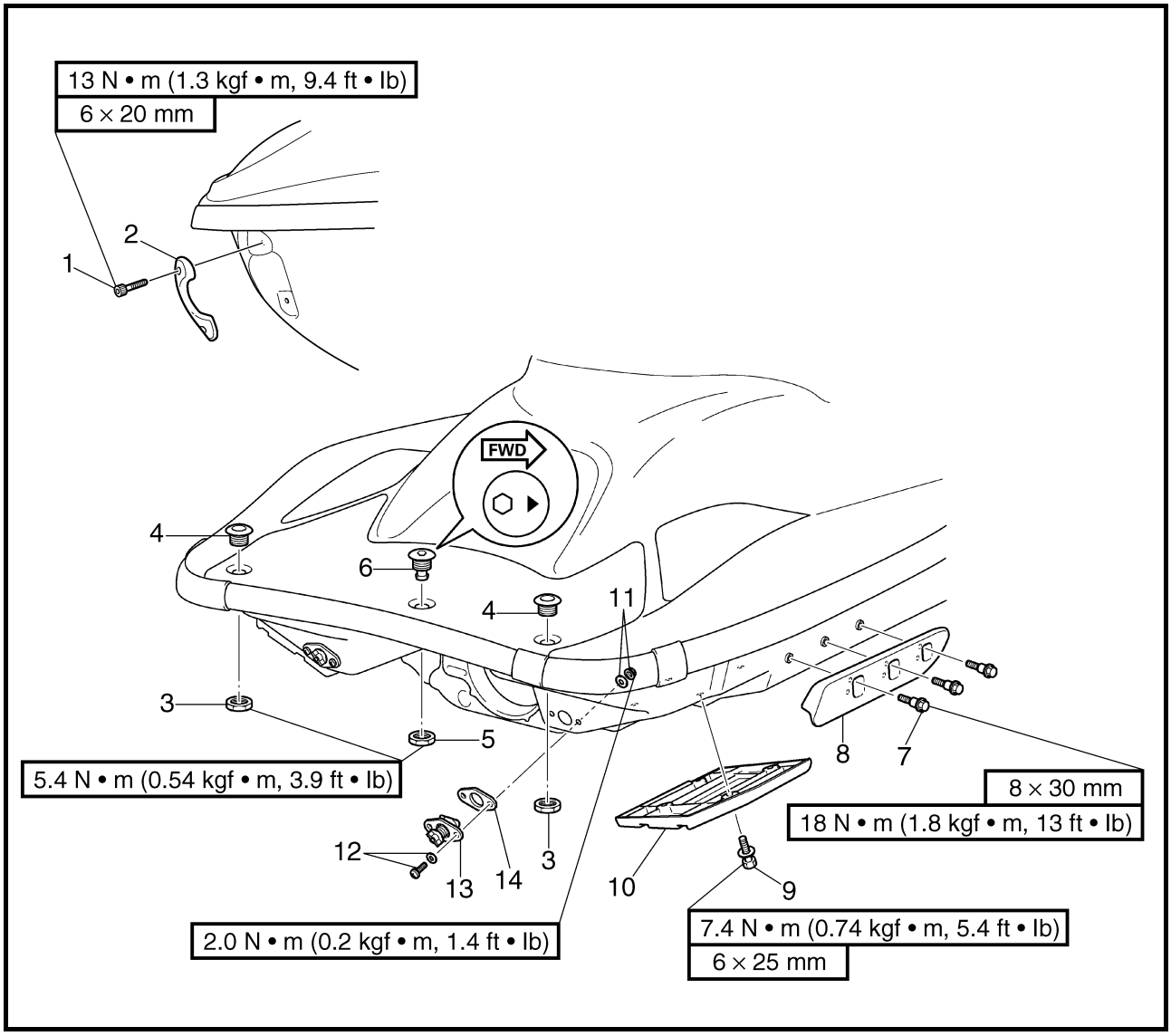
DECK AND HULL
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	DECK AND HULL DISASSEMBLY		Follow the left "Step" for disassembly.
1	Bolt	2	
2	Bow eye	1	
3	Nut	2	
4	Rope hole fitting	2	
5	Nut	1	
6	Spout	1	
7	Bolt	6	
8	Sponson	2	**NOTE:** Install the starboard and port side sponsons at the same position.

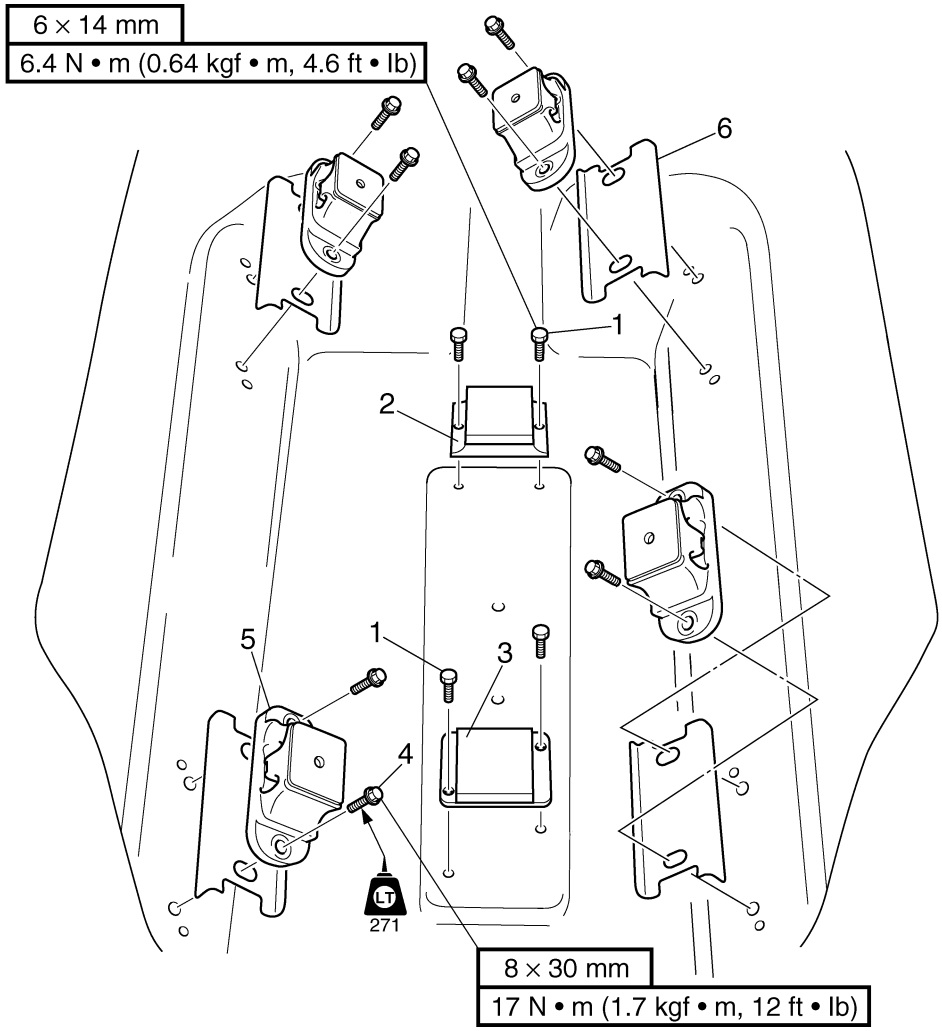
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Bolt	8	
10	Flap	2	
11	Nut/washer	4/4	
12	Screw/washer	4/4	
13	Drain plug	2	
14	Seal	2	
			Reverse the disassembly steps for assembly.

ENGINE MOUNTS

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ENGINE MOUNT REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT" in Chapter 5.
1	Bolt	4	
2	Damper 1	1	
3	Damper 2	1	
4	Bolt	8	
5	Engine mount	4	
6	Liner	4	
			Reverse the removal steps for installation.

CHAPTER 9
TROUBLE ANALYSIS

INTRODUCTION.....9-1
FEATURES 9-1
Functions.....9-1
CONTENTS.....9-1
HARDWARE REQUIREMENTS.....9-2

OPERATING.....9-3
CONNECTING THE COMMUNICATION CABLE TO THE WATERCRAFT.....9-3

TROUBLE ANALYSIS.....9-4
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INTRODUCTION

FEATURES

The newly developed Yamaha Diagnostic System provides quicker detection and analysis of engine malfunctions for quicker troubleshooting procedures than traditional methods.
By connecting your computer to the ECM (Electronic Control Module) of a watercraft using the communication cable, this software can be used to display sensor data and data stored in the ECM on a computer's monitor.
If this software is run on Microsoft Windows® 95, Windows 98, Windows Me, Windows 2000, or Windows XP the information can be displayed in colorful graphics. Also, the software can be operated using either a mouse or a keyboard.
In addition, the data for the main functions (Diagnosis, Diagnosis record, Engine monitor, and Data logger) can be saved on a disk or printed out.

Functions

1. **Diagnosis:** Each sensor's status and each ECM diagnosis code or item is displayed. This enables you to find malfunctioning parts and controls quickly.
2. **Diagnosis record:** Sensors that had been activated and ECM diagnostic codes that have been recorded are displayed. This allows you to check the watercraft's record of malfunctions.
3. **Engine monitor:** Each sensor's status and the ECM data are displayed while the engine is running. This enables you to find malfunctioning parts quickly.
4. **Stationary test:** With the engine off, ignition, fuel injection, stepping motor, YPVS, and the electric fuel pump are checked. These tests can be performed quickly.
5. **Active test:** With the engine running, each firing cylinder has dropped and the engine speed is checked for changes to determine whether the cylinder is malfunctioning. These tests can be performed quickly.
6. **Data logger:** From the data stored in the ECM, at least two items of 78 seconds of recorded data are displayed on a graph. In addition, the operating time as compared to the engine speed and the total operating time are displayed. This allows you to check the operating status of the engine.
7. **Some files:** Lets you select and run other applications while continuing to run the diagnostic program.

CONTENTS

1. Software (1)
2. Adapter (1)
3. Communication cable (1)
4. Instruction Manual (1)
5. Installation Manual (1)

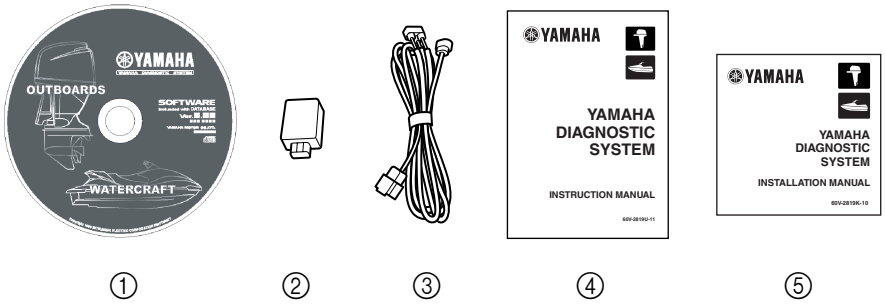


Fig. 1

HARDWARE REQUIREMENTS

Make sure that your computer meets the following requirements before using this software.

Computer:	IBM-compatible computer
Operating system:	Microsoft (Windows 95), Windows 98, Windows Me, Windows 2000, or Windows XP (English version)
CPU:	
Windows 95/98:	i486X, 100 MHz or higher (Pentium 100 MHz or higher recommended)
Windows Me/2000:	Pentium, 166 MHz or higher (Pentium 233 MHz or higher recommended)
Windows XP:	Pentium, 300 MHz or higher (Pentium 500 MHz or higher recommended)
Memory:	
Windows 95/98:	16 MB or more (32 MB or more recommended)
Windows Me:	32 MB or more (64 MB or more recommended)
Windows 2000:	64 MB or more (128 MB or more recommended)
Windows XP:	128 MB or more (256 MB or more recommended)
Hard disk free space:	20 MB or more (40 MB or more recommended)
Drive:	CD-ROM drive
Display:	VGA (640 × 480 pixels), (SVGA [800 × 600 pixels] or more recommended) 256 or more colors
Mouse:	Compatible with the operating systems mentioned above
Communication port:	RS232C (Dsub-9 pin) port, USB port
Printer:	Compatible with the operating systems mentioned above

NOTE:

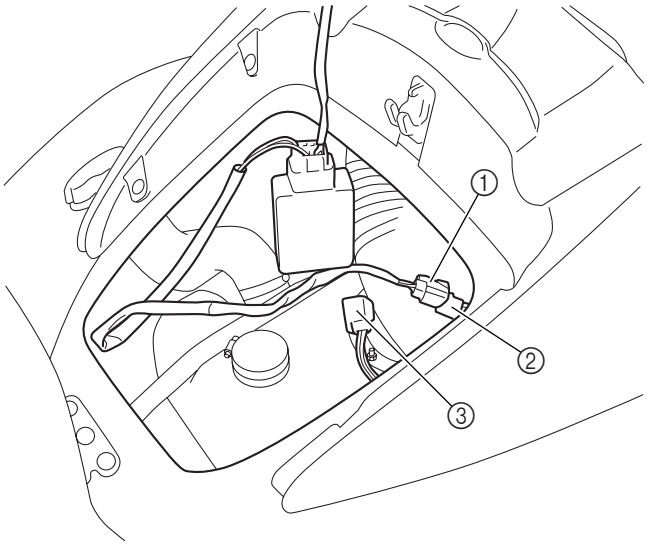
- The amount of memory and the amount of free space on the hard disk differs depending on the computer.
- Using this software while there is not enough free space on the hard disk could cause errors and result in insufficient memory.
- This software will not run properly on some computers.
- When starting up this program, do not start other software applications.
- Do not use the screen saver function or the energy saving feature when using this program.
- If the ECM is changed, restart the program.
- Window XP is a multiuser operating system, therefore, be sure to end this program if the login user is changed.
- The USB adapter cannot be used with Windows 95.

For operating instructions of the Yamaha Diagnostic System, refer to the “Yamaha Diagnostic System Instruction Manual.”

OPERATING

CONNECTING THE COMMUNICATION CABLE TO THE WATERCRAFT

Model: GP1300R
Top view



① 3-pin communication coupler
② Wire harness coupler
③ Multifunction meter coupler

NOTE:

Be careful not to pinch the communication cable between the **hood** and the **deck** or to damage it.

TROUBLE ANALYSIS

NOTE:

Before consulting the “TROUBLE ANALYSIS CHART,” check the following items.

1. Check that the battery is charged and that its specified gravity is within specification.
2. Check that there are no incorrect wiring connections.
3. Check that all wiring connections are properly secured and that they are not rusty.
4. Check that the engine shut-off cord (lanyard) is connected to the engine shut-off switch.
5. Check that fuel is reaching the throttle bodies.

TROUBLE ANALYSIS CHART

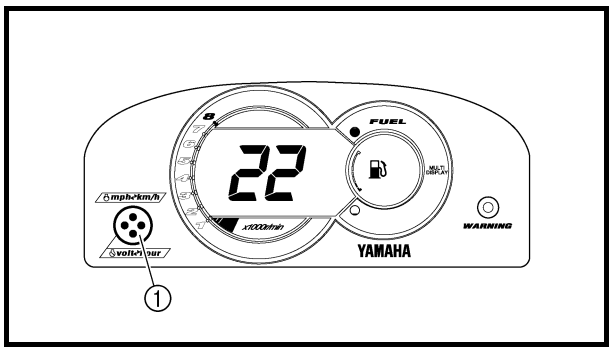
Symptom															Check items	
ENGINE WILL NOT START	HARD STARTING	ROUGH IDLING	HIGH IDLING	ENGINE STALLS	POOR ACCELERATION	ENGINE WILL NOT STOP	POOR PERFORMANCE	LIMITED ENGINE SPEED	OVERHEATING	LOOSE STEERING	BILGE WATER ACCUMULATION	IRREGULAR WARNING INDICATION	POOR BATTERY CHARGING	YPVS SERVOMOTOR DOES NOT OPERATE	Applicable part	Chapter
															FUEL SYSTEM	
○	○	○		○	○		○	○							Fuel tank	4
○	○	○		○	○		○	○							Fuel tank breather hoses	4
○	○	○		○	○		○	○							Fuel hose	4
○	○	○		○	○		○	○							Fuel filter	4
○	○	○		○	○		○	○							Fuel pump	4
○	○	○		○	○		○	○							Fuel injectors	4
															POWER UNIT	
○	○	○		○	○		○	○							Compression pressure	5
○	○	○					○	○	○						Cylinder head gaskets	5
○	○	○		○	○		○	○	○						Cylinder block	5
○	○	○		○	○		○	○							Crankcase	5
○	○	○		○	○		○	○							Piston rings	5
○	○	○		○	○		○	○							Pistons	5
○	○	○		○	○		○	○							Bearings	5
○	○	○		○	○		○	○							Reed valves	5
○	○						○	○							Seals	5
							○								Bearing housing	5
		○					○								Drive couplings	5
							○								Rubber coupling	5
									○		○				Cooling water hose (pilot)	5
									○		○				Cooling water hoses	5
									○		○				Water passages	5

TROUBLE ANALYSIS

Symptom															Check items	
ENGINE WILL NOT START	HARD STARTING	ROUGH IDLING	HIGH IDLING	ENGINE STALLS	POOR ACCELERATION	ENGINE WILL NOT STOP	POOR PERFORMANCE	LIMITED ENGINE SPEED	OVERHEATING	LOOSE STEERING	BILGE WATER ACCUMULATION	IRREGULAR WARNING INDICATION	POOR BATTERY CHARGING	YPVS SERVOMOTOR DOES NOT OPERATE	Applicable part	Chapter
															JET PUMP UNIT	
							○		○		○				Impeller duct	6
							○								Impeller	6
							○		○						Intake grate	6
		○					○								Bearings	6
							○		○						Intake duct	6
									○						Water inlet hose	6
											○				Bilge hoses	6
											○				Bilge strainer	3
											○				Bilge hose joints	6
															ELECTRICAL	
															Ignition system, fuel control system	
○	○	○		○	○		○								• Pickup coils	7
○			○	○		○	○	○							• ECM	7
○	○	○		○	○		○								• Ignition coils	7
○				○		○									• Slant detection switch	7
○						○									• Engine stop switch	7
○						○									• Engine shut-off switch	7
○	○	○	○	○	○	○	○								• Spark plugs	3
○						○									• Main and fuel pump relay	7
												○			• Exhaust temperature sensor	7
	○	○	○												• Atmospheric pressure sensor	7
	○	○	○												• Intake air temperature sensor	7
	○	○	○												• Engine temperature sensor	7
		○	○		○		○								• Throttle position sensor	7
												○			• Cooling water temperature sensor	7

TROUBLE ANALYSIS

Symptom															Check items	
ENGINE WILL NOT START	HARD STARTING	ROUGH IDLING	HIGH IDLING	ENGINE STALLS	POOR ACCELERATION	ENGINE WILL NOT STOP	POOR PERFORMANCE	LIMITED ENGINE SPEED	OVERHEATING	LOOSE STEERING	BILGE WATER ACCUMULATION	IRREGULAR WARNING INDICATION	POOR BATTERY CHARGING	YPVS SERVOMOTOR DOES NOT OPERATE	Applicable part	Chapter
															Starting system	
○	○					○									• Start switch	7
○						○									• Starter relay	7
○															• Starter motor	7
															YPVS	
							○							○	• YPVS unit	7
															Charging system	
													○		• Lighting coil	7
													○		• Rectifier/regulator	7
○													○		• Fuses	7
○				○									○		• Battery leads	—
○													○		• Battery	3
															Electric bilge pump	
											○				• Electric bilge pump	7
															HULL AND HOOD	
										○					Steering column	8
							○				○				Water lock	8
				○			○				○				Exhaust hose	8
							○				○				Muffler	8
											○				Drain plugs	8



SELF-DIAGNOSIS

With the engine running, press the select button ① for 8 seconds and check if an error code is indicated on the multifunction meter.

Code	Symptom
01	Normal
13	Pickup coil malfunction
15	Engine temperature sensor malfunction
18	Throttle position sensor (TPS) malfunction
19	Incorrect battery voltage
22	Atmospheric pressure sensor malfunction
23	Intake air temperature sensor malfunction
47	Slant detection switch malfunction
48	Incorrect data transmission
53	Exhaust temperature sensor malfunction
54	Stepping motor malfunction
55	Steering switch malfunction
59	Memory data malfunction
64	YPVS servomotor malfunction
65	Cooling water temperature sensor malfunction
66	Stepping motor stuck closed
67	Stepping motor stuck open

If the Yamaha Diagnostic System is not used to check the symptoms listed in the table, the error codes can be checked easily with the self-diagnosis in the multifunction meter. However, if there are numerous error codes displayed, be sure to check them with the Yamaha Diagnostic System.

GP1300R

1	2	3	4	5	6	7	8	9	10	11	12
G	Y	W	W/L	B/Y	B/G	B/O	B/L	W/L	O	W/Y	W/B
13	14	15	16	17	18	19	20	21	22	23	24
W/R	L/R	G/B	G/R	G	G/Y	B/R	O	L	G	P	Pu/Y
25	26	27	28	29	30	31	32	33	34	35	
Pu/B	Pu/R	R/Y	L/B	B	P/G	P	W/B	B	B/Y	B/W	

GP1300R-CWD

WIRING DIAGRAM
GP1300R

① ECM
② Atmospheric pressure sensor
③ YPVS servomotor
④ Spark plugs
⑤ Ignition coils
⑥ Fuse (20 A)
⑦ Fuses (3 A)
⑧ Main and fuel pump relay
⑨ Starter relay
⑩ Starter motor
⑪ Battery
⑫ Rectifier/regulator
⑬ Throttle switch
⑭ Electrical bilge pump
⑮ Exhaust temperature sensor
⑯ Cooling water temperature sensor
⑰ Throttle position sensor
⑱ Fuel injectors
⑲ Engine temperature sensor
⑳ Stepping motor
㉑ Intake air temperature sensor
㉒ Lighting coil
㉓ Pickup coil
㉔ Steering switch
㉕ Oil level sensor
㉖ Buzzer
㉗ Speed sensor
㉘ Multifunction meter
㉙ Fuel pump
㉚ Fuel sender
㉛ Engine stop switch
㉜ Engine shut-off switch
㉝ Start switch
㉞ Slant detection switch

Ⓐ To tachometer

Color code

B : Black
Br : Brown
G : Green
Gy : Gray
L : Blue
O : Orange
P : Pink
R : Red
W : White
Y : Yellow
B/G : Black/green
B/L : Black/blue
B/O : Black/orange
B/R : Black/red
B/W : Black/white
B/Y : Black/yellow
G/B : Green/black
G/R : Green/red
G/Y : Green/yellow
L/B : Blue/black
L/R : Blue/red
P/G : Pink/green
Pu/B : Purple/black
Pu/R : Purple/red
Pu/Y : Purple/yellow
R/W : Red/white
R/Y : Red/yellow
W/B : White/black
W/L : White/blue
W/R : White/red
W/Y : White/yellow
Y/B : Yellow/black

YAMAHA

YAMAHA MOTOR CORPORATION, USA

Printed in USA
Feb. 2003 – × 1 CR
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